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May
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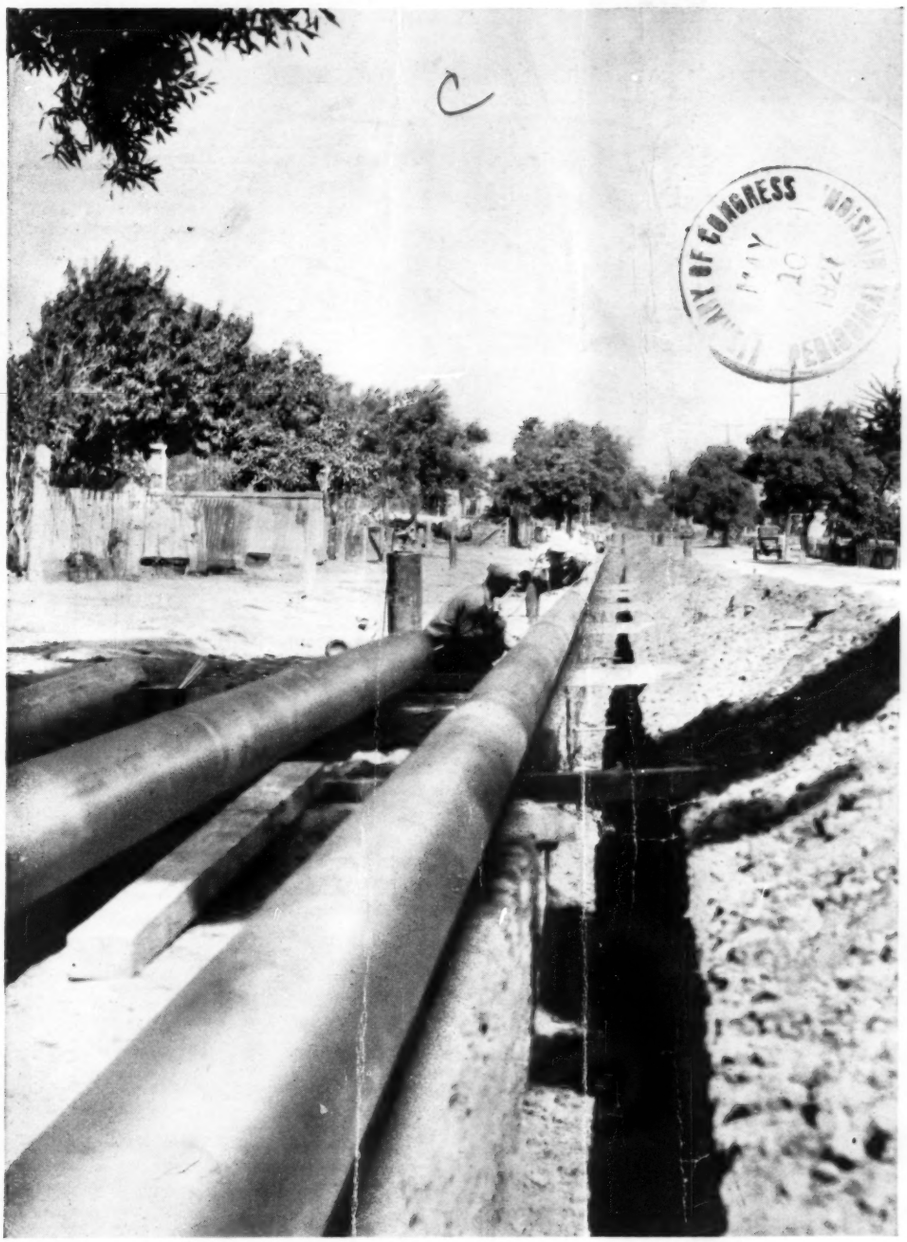
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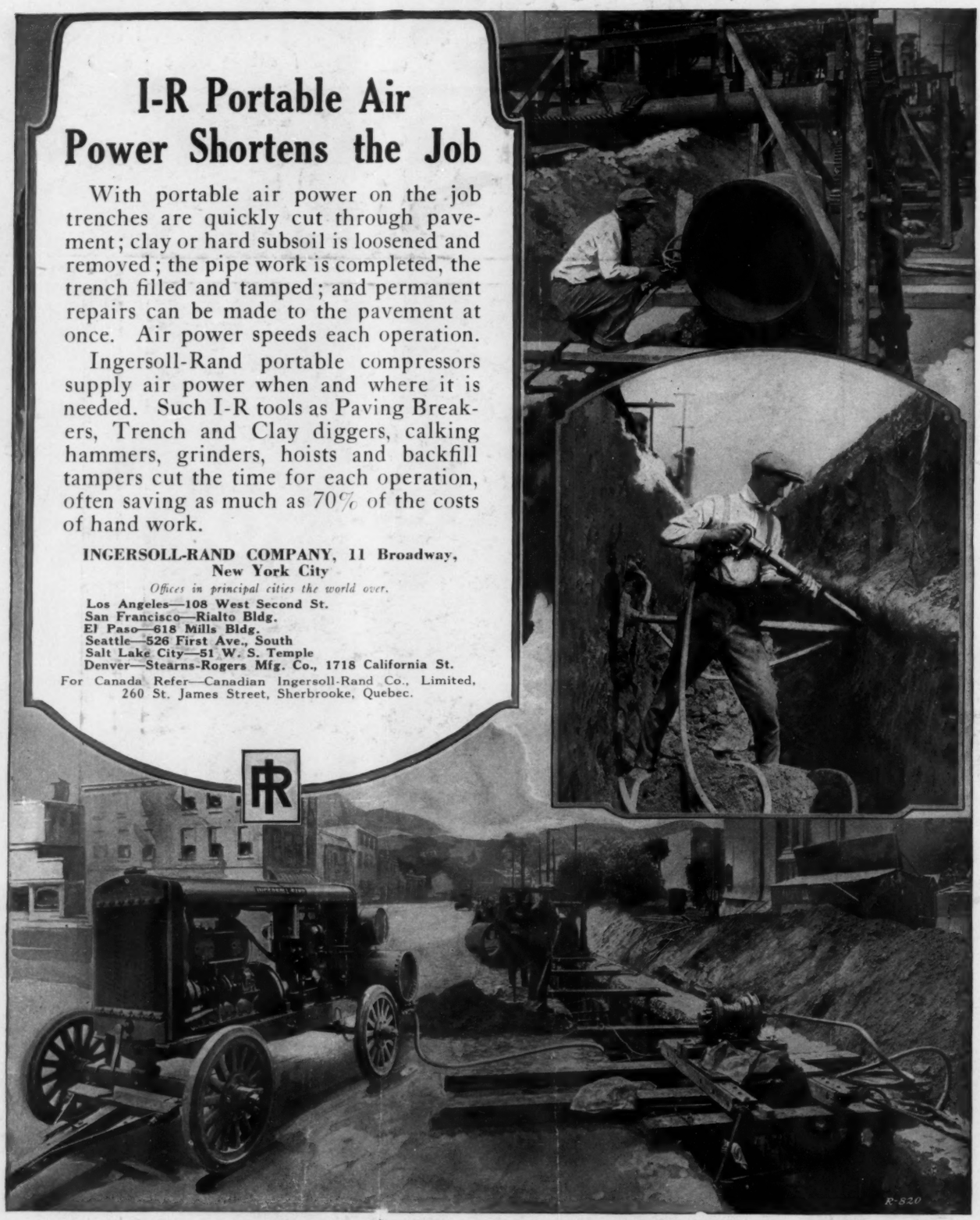

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Official Publication Of The
Pacific Coast Gas Association

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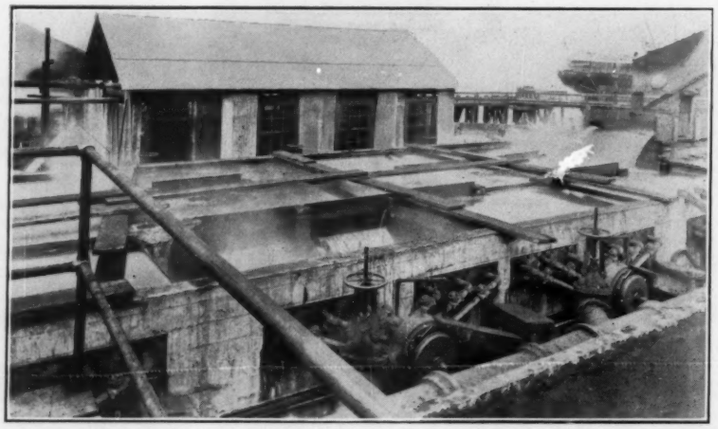

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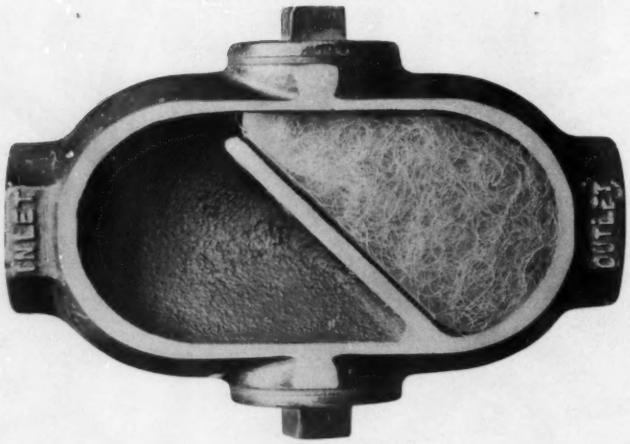

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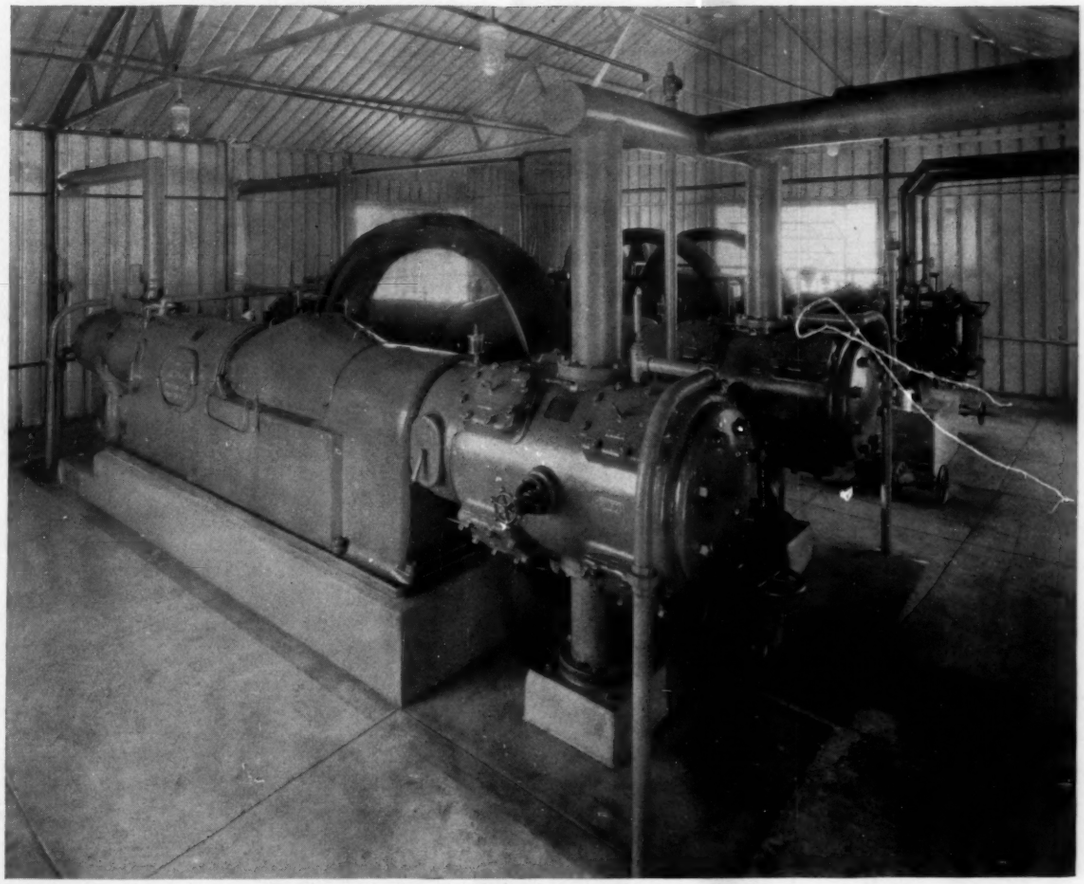

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PHILADELPHIA INQUIRER, SUNDAY MORNING, DECEMBER 26
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The city has saved $70,000 by digging up an abandoned pipe line and laying it in another location as a means of water supply, reports of Carleton E. Davis, Chief of the Water Bureau to Director Caven of the Department of Public Works, showed last week. The saving is on cast iron main forty eight inches in diameter.
The pipe, was laid in 1888 between the old Spring Garden Pumping Station and the East Park Reservoir. It consists of four separate lines and as the Girard avenue bridge over the Schuylkill River was abandoned ten or twelve years ago the pipes have been unused since that time. It was discovered that they are in good condition and after being cleaned and relaid will have an effective life over an indefinite period.
It was decided to put these pipes to use in relieving conditions in the lower end of West Philadelphia, where the population has increased rapidly and the demand for water has outgrown the existing facilities.
The plans now being put into execution for extending the forty-eight inch main, which now terminates at Fifty-seventh street and Cedar avenue in a southerly direction, generally along the line of Fifty-sixth street to Woodland avenue.

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WESTERN GAS

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in the *Eleven Western States*

The Success *of* Any Public Relations Policy Rests *with the* Employees

By DON C. RAY
Manager Bureau of Public Relations
Pacific Gas and Electric Company

A paper read at the recent sectional meeting of the Pacific Coast Gas Association at Tucson, Arizona, and previously delivered at the Association's San Diego session.

VOLUMES have been written and innumerable addresses and talks have been made on the subject of Public Relations, especially as they affect the field of public utility operation. In nearly every issue of periodicals or magazines devoted to the various utilities, constructive and informative articles are appearing in which we are told of ways and means of encouraging a better understanding on the part of the public of what the utilities are actually doing; of the responsibilities assumed by virtue of certain rights and privileges granted them by the public; of how the utilities are discharging those responsibilities to the best interests of the public, and that in the dispensation of adequate and necessary service at just and reasonable rates, the utilities are an essential and important factor in the social and economic growth and development of the Nation. Newspapers carry a large amount of institutional or good will advertising designed to acquaint the public with the objects and ideals of our respective industries. Public Utility Information Committees have been formed in a large number of the States and generally they are doing a very excellent and useful work in securing pertinent and dependable data on public utility administration, and by means of their own publications or through the press and other media, are disseminating this data to the mutual advantage of the public and the utilities.

Don C. Ray

Outstanding men in the public utility industry have either initiated or given indorsement to the movements outlined, which is to say that the subject of public relations is conceded to be an all important one and that the continued stability and success of our industry is primarily dependent upon the favorable attitude of the consuming public.

Public Must Know Utility Story

All of this is as it should be. The public utilities of this Nation are rendering a service not even remotely approached by those of any other country in the world. The industrial supremacy of the United States, while not to be credited directly or solely to public utility service, could not have been attained without it. The public utilities, privately owned and operated, by anticipating and keeping ahead of the demands of industry have made this wonderful development possible. The public should and must know this, and the method now being followed in telling the true story of the public utilities will be fruitful of results beneficial alike to the utilities and the public whom they serve.

Such plans as have here been briefly outlined, are of necessity carried on by executives and department heads directing public relations activities, numerically a very small proportion of those engaged in the public utility business. Excellent progress is being made but the potential accomplishments of such efforts will not be fully realized unless and until each and every employee in our industry assumes his individual responsibility and does his part in the furtherance of this important work.

The spoken word or written article cannot alone accomplish the desired end. The audience or the reader, and by this I mean the public, must be in a receptive attitude. Here is where the organization personnel of our industry has its opportunity; here is where we, as employees, are privileged to perform our respective duties in such a manner that the service policies of our executives, as expressed in the spoken and written word, are properly interpreted to the public. People are of course concerned in our account of what we have done for them, in promises of what we are going to do, but they are much more vitally concerned in what we are doing and have actually done. They are much more likely to believe in our statements and promises if our record of past and present performance has established us in their confidence. Words are impotent unless backed by deeds. It is the practical application of our public relations policies that in the final analysis will gain for us either the favorable or unfavorable attitude of the public. If properly applied, reaction will be favorable for, in the main, our policies are unquestionably right.

Applied public relations is essentially a function of the employee organization. In the daily contacts with consumers and the public, the employee represents,

in fact is, the company. He should be entirely conversant with his company's aims and ideals; he should be in possession of all essential information it is desired the consumer should know; he should be imbued with the true spirit of service; he should know that a public utility can justify itself only in so far as it renders a beneficial service to society; he should know that his ultimate boss is the consumer and that his own self interest demands that the boss be satisfied. Supported by a management that has provided modern and adequate physical facilities, the employee should know that this boss (the public) will be satisfied and satisfied only when the service rendered him is accompanied with honest treatment, courteous demeanor, and a proper consideration for the rights and opinions of others.

The employee should know that if he is to get along well with the consumers he must be in harmonious relations with his fellow employee. Courtesy and consideration for others, like charity, begins at home. The Golden Rule, which should be the guiding star of every public utility employee, does not discriminate between men, nor as to the position they occupy. Give me an organization of employees who have developed a true spirit of friendly cooperation, who are honest and truthful, and who have thoughtful consideration for one another, and I will present you with an organization which, if your policies are right, will attack and solve successfully any public relations problem with which you may be confronted.

The trouble is—no such organization exists. Such should, however, be the objective of every man engaged in the direction of public relations activities. The goal of perfection may never be reached, but my observations have convinced me that there is much room for improvement in this direction. Consistent and persistent effort along this line is most desirable.

WHEN speaking of employees the term is not confined to what is ordinarily referred to as the "rank and file"; it comprehends every man and woman in the organization from the highest executive officer to the man in the ditch. The use of the word employee in the usually restricted sense is a fault altogther too prevalent and, in my opinion, is a very definite reason why the organization as a whole does not function as it should. Initiating public relation policies and instructing employees in the correct interpretation and application of those policies, is a relatively simple matter. The difficulty lies in impressing the rank and file—those of the organization that make the major number of actual contacts with the public—with your sincerity of purpose, with the propriety of the policies promoted, and with the fact that their interests as well as those of the Company by whom they are employed, are dependent upon the conscientious observance of those policies. Again this cannot and is not done by mere words. These men will, to a considerable extent, emulate the example of their superiors whether those superiors be foremen, superintendents, managers, department heads or higher executives. Men will follow a leader to extremes but they will fall far short of the goal in the absence of leadership or if the pressure is exerted with a driving rather than a pulling force.

ANY executive, and by that I refer to any one directing the efforts of one or more subordinates, should realize that he is dealing with flesh and blood men, real human beings, and should know the psychological truth that the reaction of these men will almost invariably be identical with the impressions received by them. If it is desired that your subordinate be courteous, be courteous to him; if you wish truthfulness and honestness, exhibit these virtues in your dealings with him; if you expect thoughtful consideration, be you thoughtful and considerate of him; and if you want loyalty, and that is what you are most urgently in need of, you must practice loyalty toward him. Speaking of loyalty, I am reminded of a statement made by an eastern executive eminently successful in industry who said, "Many executives make the mistake of believing that loyalty works but one way—from the bottom up. Either it works both ways or it works not at all and—it begins at the top. Loyalty is secured by injecting the human element into industry and to humanize industry you must always bear in mind that the other fellow has feelings, hopes, aspirations, desires, and rights similar to your own."

Substantially every man here today is an executive in the sense in which I have used that term. How many of you subscribe to the doctrine just stated and, what is more to the point, how many endeavor to practice that doctrine in the daily performance of your particular duties? In my humble judgment, upon the affirmative answer to that question, depends the degree to which the respective company organizations of our industry will approach their possible ultimate efficiency in the rendition of service which always underlies and definitely determines your public relations.

At this point I want to digress slightly from my subject to discuss a problem that is a perennial menace to the gas industry both as to sales and public relations. It is the source of much unfavorable publicity to gas companies, a great deal of which is not deserved it is true, but which nevertheless has an adverse effect on the industry. The reference, as you have probably surmised, is to explosions and asphyxiations. I shall attempt to briefly discuss the subject from a public relations viewpoint.

Explosions and asphyxiations do not result from the use of gas but from its misuse. A great majority of them are preventable and the fact that more proggress has not been made in their prevention is not particularly to the credit of those interested in the various branches of the gas business.

There has been a tendency to avoid careful and exhaustive investigation into causes of these accidents due to what I think is a misconceived idea that it may lead to unwelcome criticism or to possible liability.

Each and every accident resulting from the use or rather the abuse of gas should be immediately and thoroughly investigated by the gas company. The results of those investigations should be recorded in strict conformity with the developed facts. Definite recommendations for prevention of recurring similar accidents should, where possible, be given. When fatalities or serious damages obtain, publicity is certain to follow. Close contact should be maintained with newspapers to insure against unfair and unwarranted press reports.

A LAUDABLE exception to lack of proper investigation of asphyxiation was that made as a result of the rather serious condition obtaining in the City of Los Angeles last winter. A committee headed by H. L. Masser, gas engineer, Los Angeles Gas and Electric Corporation, made a very thorough survey and report of this situation and has submitted recommendations which if adopted will undoubtedly be effective in accident prevention. During the period covered by the report, 42 asphyxiations occurred in Los Angeles, 28 of which were fatal. Incidentally the report shows that most of these accidents were preventable. It is to the prevention of all preventable accidents that the gas industry and particularly the gas companies should address themselves.

Preventative asphyxiations and explosions result from various causes such as improper use of appliances, use of appliances improperly designed or adjusted, lack of proper room ventilation, etc. Few are directly attributable to the gas company.

This however should not encourage an

(*Continued on Page 48*)

Meeting *the* Problem *of* Electrolysis *in* Underground Pipe Protection

By B. A. Williamson
Los Angeles Gas and Electric Corporation
Electrolysis Engineer

THE transmission lines, distribution mains and service pipes of underground pipe systems are the arteries, blood vessels and capillaries of a modern city, through which flow the vital fluids of oil, gas and water. The construction of these intricate metallic fabrics requires ability, time and capital, in no small degrees. Since these investments exist to supply the public with absolute necessities, it is the consumer who rightfully pays for their use and depreciation.

The life of the average pipe has been estimated to be twenty-five years and this annual depreciation of 4 per cent is higher than some classes of machinery and certainly greater than for most overhead structures of iron. This metal, when installed either above or under ground, is subject to severe corrosion. If above the ground the corrosion is called rust and is due to the action of the moisture and oxygen. The destruction begins at the outside and proceeds inward slowly, until the whole body is weakened to the point it becomes worthless. In other words, it is always the surface that is attacked and anything that will preserve the surface will save all. Thus it is that insurance policies against rust are written not with pen and ink but with brush and paint. Above ground this painting may be done any number of times, just as needed, a fact which partly accounts for the life of iron being longer above than beneath the ground. Another reason is, iron in contact with soil is subject to two different forms of corrosion, either of which may exceed the rate of rusting of iron.

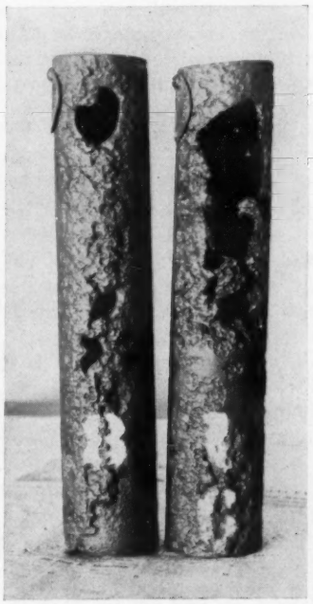

Figure 1. Showing effect of electrolysis on bare pipe.

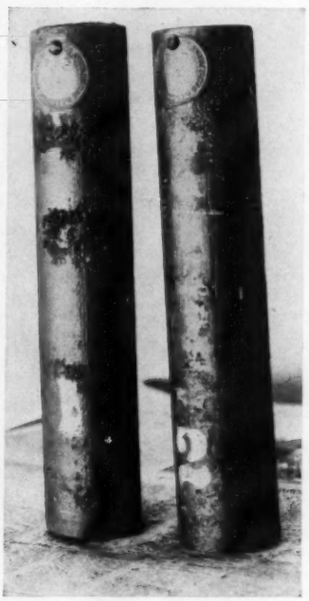

Figure 2. Effect on machine wrapped pipe, small overlap.

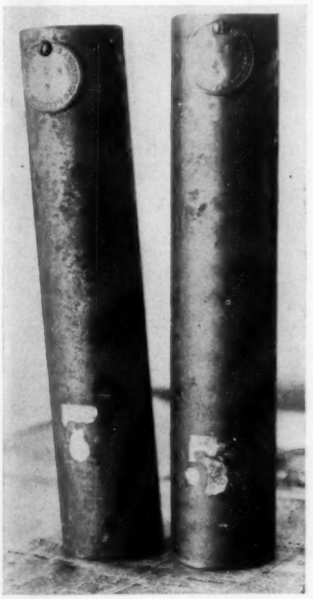

Figure 3. The effect on pipe wrapped with large overlap.

The loss of iron in soil, due to the combined assaults of chemicals, oxygen and water, is called soil corrosion to distinguish it from ordinary rusting in the air. Research engineers have tried, without success, to learn the nature and cause of corrosion. This is a simple statement of one of their unproven theories: since iron pipe is never chemically pure, there are throughout its body other metals such as carbon and zinc in free states. Thus it may be imagined that molecules of carbon and zinc exist side by side on the surface and in contact with the soil. Since these metals are the elements of dry cell batteries, they are supposed to generate feeble electric currents, which flow from one to the other through the soil in a manner to cause the corrosion. An idea of this galvanic action may be had by placing the tongue between copper and silver coins whose edges touch. The metallic taste is that of dissolved metal. When these and other equally important technical problems have been solved, great improvement may be expected in pipe protection.

Since soil corrosion is much the same as rusting, the method of preventing the action is also the same in the application of surface insulations. These insulations may be paints, dips or wrappings and should be as nearly 100 per cent waterproof as possible. Since soil water contains chemicals and oxygen in solution, a perfect waterproof insulation would keep the pipe free from all contact with the soil and thereby afford perfect protection. The difficulty is in finding a covering that will remain waterproof for an indefinite time and be immune from the deteriorating action of the earth. In fact, perfect pipe insulations do not exist either for underground work or for overhead requirements.

The practice of insulating pipe to prevent soil corrosion, however, has never been questioned. The problem has been to select the best coverings, taking into account their cost, efficiency and durability. There are many preparations on the market, for which all kinds of claims are made. Evidently it would require a very long time, say 10 years, to make comparative tests of these by applying them to pipes to be buried until they were corroded to considerable extent. It is this element of time that makes comparative tests of pipe insulations difficult. In view of the fact that the object in covering pipe is saving money, it is necessary that the cost of the insulation shall be materially less than the protection it affords. This means that in bad soils the more costly

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What It Costs *to* Manufacture Gas

By CLAUDE C. BROWN, *Gas Engineer*
Railroad Commission of the State of California

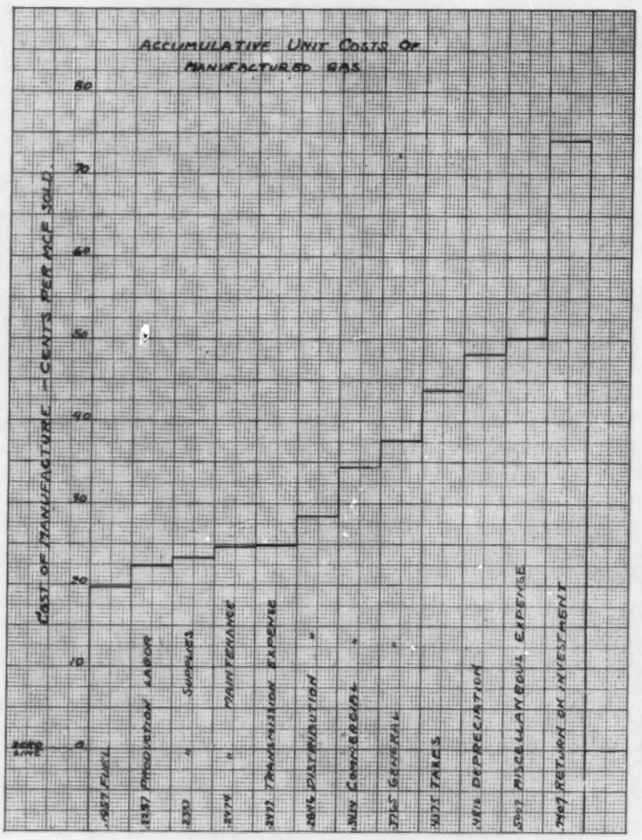
This article is the first half of Mr. Brown's discussion of costs of gas service. A second article, on natural gas costs, will follow in an early issue.

THE rate at which any commodity can be sold to the public is determined in one of two ways—either by the maximum rate that the traffic will bear, or by the actual cost of production and marketing plus a reasonable rate of return upon the capital invested in the manufacturing enterprise.

In the case of privately owned public utilities which operate under state regulation, the rate to be charged for their product or more properly stated, their service, is determined by the latter method. The utilization of this method of determining rates, when accompanied by a minimum of capital expenditure and a maximum of operating efficiency and economy, insures a minimum rate to the consumer for the commodity or service in question.

Some Factors of Cost

The large present day public utility that manufactures and distributes gas, is in effect a combination of producer, wholesaler and retailer, operating a credit business of enormous proportions. The gas utility sells large quantities of gas to a small number of large industrial consumers and at the same time sells small quantities of gas to a very large number of small domestic consumers. One meter may suffice to measure the quantity of gas sold to a large industrial factory, while it takes many hundreds of small meters to register the same quantity of gas sold to a group of domestic consumers.



The cost of reading a meter and billing a consumer is the same whether he uses 2000 cubic feet of gas or 10 million cubic feet per month. The cost of reading and billing the small domestic consumer's meter is just as large as the cost of reading and billing the large industrial installation, so that the aggregate cost of these items for the number of domestic consumers who use a total of 10 million cubic feet of gas per month is greatly in excess of the cost of the same items for a single large industrial user who uses this quantity of gas through a single meter.

An Example

The number of elements that enter into the cost of manufactured gas is large. For instance, let us take a utility that is manufacturing gas from oil and natural gas. There are a number of utilities in Southern California that are doing this. They manufacture a mixed gas by "reforming" or breaking down and expanding the natural gas of higher heating value and mix with this reformed gas various quantities of natural gas and oil gas depending upon conditions of operation.

Suppose that this utility were of such magnitude that it sold a total of 14 billion cubic feet of gas per year with a maximum daily peak demand in the winter of 100 million cubic feet. Such a utility would probably have some 300,000 consumers on its system to whom it delivered gas for all purposes and in various quantities. The invested capital of such an enterprise would probably be in the neighborhood of $40,000,000.00, covering lands, buildings, manufacturing plant and equipment, storage holders, transmission and distribution mains, services, meters, regulators, and miscellaneous items. It would probably have a generating plant capacity of some 90 million cubic feet of gas per day with a storage holder capacity of probably 70 million cubic feet. Its distribution system would probably consist of some 2500 miles of high and low pressure mains of all sizes delivering gas to approximately 300,000 each of services and meters.

Fixed Capital Investment

The investment of fixed capital for such an enterprise might be segregated as follows:

Intangibles	$ 350,000
Lands	1,500,000
Production Buildings	1,750,000
Production Storage Holders	4,500,000
Production Boiler Equipment	1,500,000
Production Generators	2,000,000
Production Purifiers	1,500,000
Production Accessory Equipment	5,000,000
Distribution Mains	13,000,000
Distribution Services	3,500,000
Distribution Meters	2,000,000
Distribution Regulators	500,000
Distribution, Miscellaneous Equipment	100,000
General Structures	2,000,000
General Office Equipment	200,000
General Shop	100,000
General Garage	400,000
General Tools	100,000
TOTAL	$40,000,000

Adding to this amount, working cash capital consisting of two months certain operating expenses with deductions for fuel and taxes, and adding one month's fuel supply, would bring the rate base of such an enterprise up to approximately $45,000,000.00.

Unit Cost of Service

Using as a basis, the experience of California utilities, the unit costs of service per thousand cubic feet of gas sold per year for the various items of cost would be as follows:

PRODUCTION EXPENSE

	ANNUAL UNIT COST PER MCF SOLD
Production Superintendence	$0.0060
Steam Labor	0.0024
Generator Labor	0.0066
Accessory Labor	0.0090
Miscellaneous Production Labor	0.0040
Fuel for Steam	0.0162
Fuel for gas	0.0705
Steam Supplies	0.0008
Generator Supplies	0.0010
Accessory Supplies	0.0045
Miscl. Production Supplies	0.0033
Gas Purchased	0.1090
Maintenance Production Structures	0.0015
Maintenance Boilers	0.0024
Maintenance Generators	0.0051
Maintenance Purifiers	0.0006
Maintenance Production Piping	0.0013
Maintenance Accessory Equipment	0.0021
Maintenance Storage	0.0009
Maintenance Miscl. Equipment	0.0002
Total Production Expense	$0.2474

TRANSMISSION EXPENSE	ANNUAL UNIT COST PER MCF SOLD $0.0003

DISTRIBUTION EXPENSE

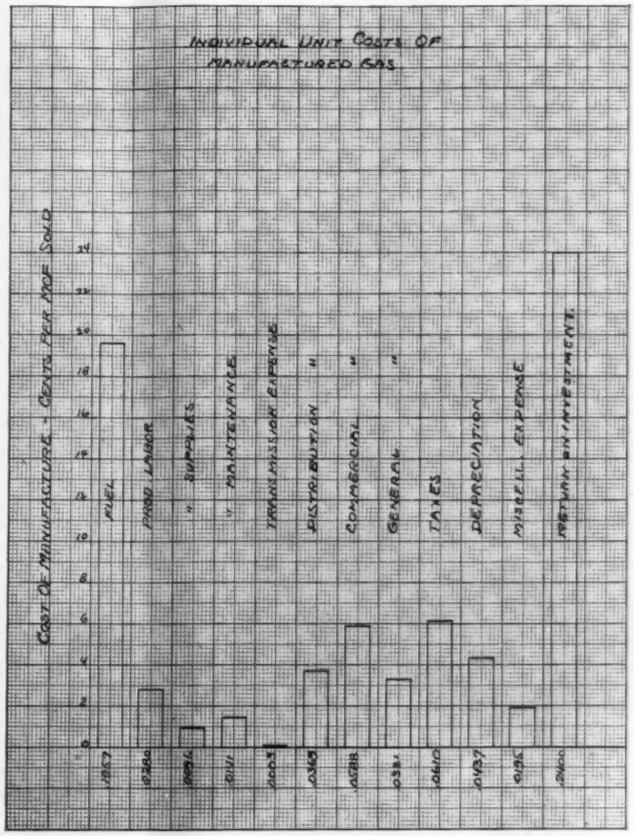
Superintendence	0.0045
Maps	0.0007
Setting Meters	0.0074
Meter Expense	0.0009
Inspection on Consumers Premises	0.0040
Inspection and Patrol	0.0040
Miscellaneous Distribution	0.0031
Maintenance Distribution Mains	0.0029
Maintenance Distribution Services	0.0046
Maintenance Distribution Meters	0.0039
Maintenance Distribution Regulators	0.0007
Miscellaneous Expense	0.0002
Total Distribution Expense	$0.0369

COMMERCIAL EXPENSE

Commercial Labor	$0.0038
Commercial Books	0.0181
Meter Reading	0.0097
Collecting	0.0166
Commercial Rents	0.0007
Commercial Supplies	0.0021
New Business Salaries	0.0024
Soliciting	0.0050
New Business Rents	0.0002
New Business Supplies	0.0002
Total Commercial Expense	$0.0588

GENERAL EXPENSE

General Offices	$0.0066



General Employees	0.0050
General Office Rents	0.0006
General Office Supplies	0.0027
General Office Expense (other)	0.0065
Law Expense	0.0019
Communication	0.0005
Insurance	0.0003
Damages	0.0016
Relief Work	0.0024
Other Miscellaneous Expense	0.0047
Maintenance General Office Bldg.	0.0002
Maintenance Miscellaneous Structures	0.0001
Total General Expanse	$0.0331

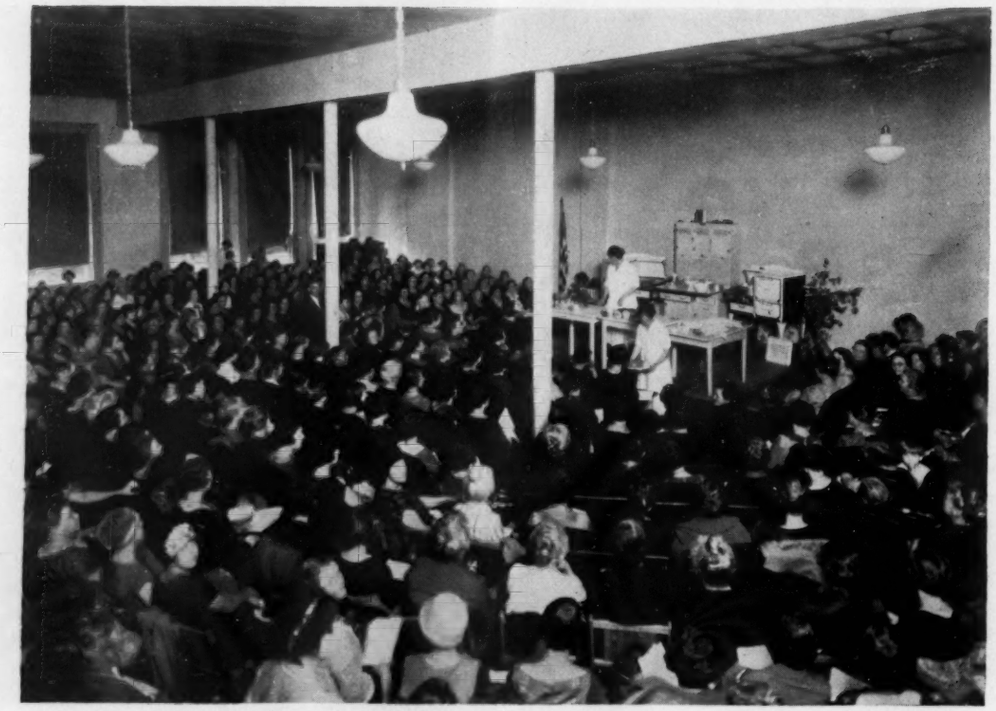
MISCELLANEOUS EXPENSE

Carbon and Briquet Expense	$0.0121
Taxes	0.0610
Uncollectible Bills	0.0074
Depreciation Annuity	0.0437
Total Miscellaneous Expense	$0.1242

SUMMARY

Production Expense	$0.2474
Transmission "	0.0003
Distribution "	0.0369
Commercial "	0.0588
General "	0.0331
Miscellaneous "	0.1242
TOTAL	$0.5007
7½% Return on Rate Base	0.2400
TOTAL	$0.7407

From the foregoing it is seen that the major items of the cost of operation are purchased gas and fuel oil, operating labor, commercial accounting and billing, taxes and depreciation.



Women employees have a well-recognized and important part in the activities of the Utah Gas and Coke Company. The Women's Committee members aid in such demonstrations as that shown at the left, when hundreds of gas users crowd the Company Auditorium.

Organizing Women Employees *for* Effective Service *to the* Public

By LILLIAS DESPAIN, *Dean of Women*
Utah Gas and Coke Company, Salt Lake City, Utah

REALIZING the important part that women play in the utility industry, the Utah Gas and Coke Company suggested the organization of their women employees into a Women's Public Information Committee, for the purpose of giving them the opportunity to learn more about the business and to encourage each one to put forth an effort to become more efficient and valuable to herself, to her company, and to the public she serves.

The public by some means must be made to sufficiently appreciate the part which the utility plays in the development of the city or the community and the conveniences of the home. Who should have the knowledge to bring them to this realization better than utility employees themselves? And, of the utility employees, who are more logically capable of accomplishing this end than properly trained, advised and informed women employees? Women with their inherent qualities of patience and tact, find an ideal place in the utility industry to broaden and develop.

Sell Utilities to Women

Women, the engineers of the home, are without question the utilities' principal domestic customers and as such must be pleased with their utility service, must be sold on its economics and consequently must become boosters for it. The Women's Committee, organized for service of the highest type, establishes the possibility of a contact invaluable to the home, to the woman employee and the utility. Through such contact the chief reliance of the home comes into closer contact with the company's policies and opportunity is offered to educate the women of the country in the fundamental economic principles of the industry and the interdependence of the utilities and the public.

Without knowledge there is fear and misunderstanding. Utilities for years, possibly rightfully under the circumstances, were secretive as to their inmost structure. Consequently there could be no understanding between them and the public and as a result utilities materially suffered. Some of the old public idea of utilities still remains. The public does not sense that the average utility of this day and time has nothing to conceal and could conceal nothing if it would.

Women are at times accused of irrational ideas, particularly as to business. Are not such ideas more apt to be an outgrowth of misunderstanding, first on the part of the woman and second on the part of the man who did not have the ability to grasp her viewpoint and properly explain to her the intricacies of the utility business? Far-seeing utilities throughout the country believe that utility women can more quickly grasp the customer woman's viewpoint and eradicate her misconceptions from her mind in a satisfactory way. If the utility woman paves the way with knowledge of the business and directs this knowledge along proper channels with well conceived efforts, there is no more limit to the success she can attain in the utility industry than that of the man employee. A woman's possibilities in the business world are just what she makes them.

Opportunity for Women

Through the consideration of the management the Utah Gas and Coke Company recognizes the latent ability of its women employees and opportunity is given them to develop their ability for the important part they may play in the utility industry. It helps them to look on success in the business world not as something to obtain but as something to attain.

The various considerations affecting women employees of the Company come through the Women's Committee. Matters concerning the employment of women and duties pertaining to different phases of their work are referred direct from the management to the dean of women. In this way the utmost consideration and recognition is accorded women as an important factor in the company organization.

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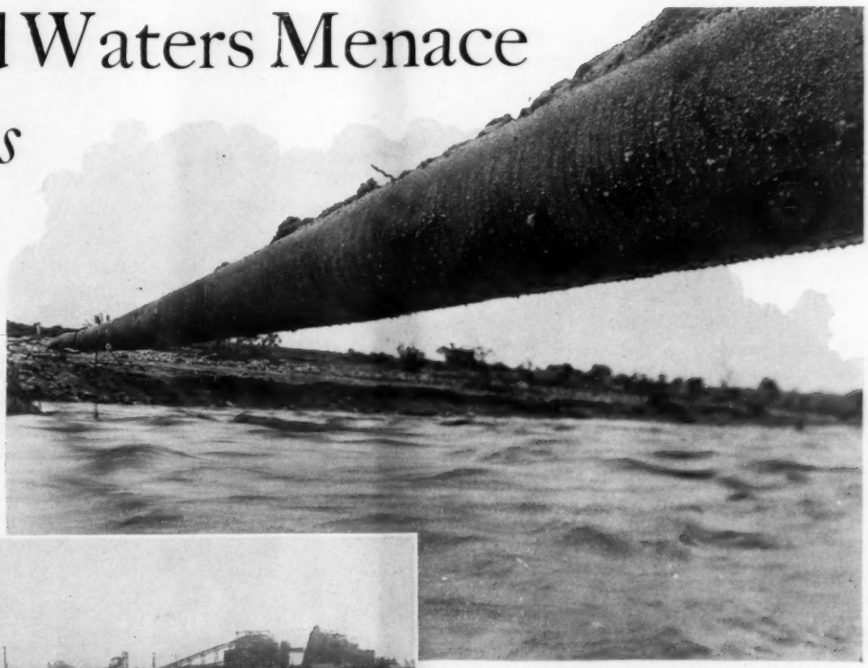
Raging Flood Waters Menace *Natural Gas* Service

Emergency Crews Swing into Action as Big Tujunga Wash Torrents Sever 13-inch Line of Southern Counties Gas Co.

By Clyde H. Potter



Above: *Southern Counties natural gas main over Big Tujunga wash, Southern California, on April 6, when first flood waters had dropped to a point three feet below the line.* Left: *Another view, showing the trestle (in the background) which later collapsed, washed down stream and broke the main.*

Unprecedented April downpours and storms, considered the severest in a half century, according to United States Weather Bureau statistics, seriously threatened public utility service throughout Southern California and necessitated a considerable amount of emergency construction work on the part of the Southern Counties Gas Company, whose transmission mains spread a network of gas lines across Los Angeles, Orange, San Bernardino, Ventura and Santa Barbara Counties.

Three major breaks occurred in the Company's transmission mains, as follows: the Orange County-Carbon Canyon 10-inch line parted when a portion of the Carbon Canyon highway gave way during the storm; the Ventura-Santa Barbara 6-inch natural gas transmission main was broken at the crossing of Rincon Creek; and the newly installed Ventura-Los Angeles 13-inch line was washed out where it crosses Big Tujunga Wash in San Fernando Valley.

Big Tujunga Damage Severe

By far the most serious damage resulting from the April storms was the washout of the Company's transmission main in the Big Tujunga Wash. Across this wash the Company had laid its gas main to a depth of four feet below the bottom of the flood control channel. When the storm waters poured out of the Big Tujunga mountains early on Monday, April 5th, a stream of considerable size developed in this wash. This steam rapidly eroded its channel, exposing our line to the full force of the current and the menace of floating debris and timbers, for a distance of about 80 feet.

The exposed line successfully withstood this strain and on Monday afternoon the stream began to subside. In the meantime an emergency crew was dispatched to the scene and the work of giving the endangered gas line additional support was begun. Two cables were clamped to the exposed main. These were made fast to "dead men" buried on the east bank of the stream.

In order to give further support to the line which brings natural gas from the Ventura River fields to Los Angeles, a cable was suspended from either bank on hastily erected "A" towers. On Monday night the stream reached a new high stage, again submerging the line. But the emergency cables proved their worth and the main held fast.

The emergency crew sent to the wash was under the direction of District Manager W. G. Rich of Whittier. Prompt work on the part of Mr. Rich and his crew undoubtedly saved the line from washing out during the initial peak of the storm on Monday.

By early Tuesday morning a deep channel had been cut by the water, which was at that time flowing underneath the line. The storm had somewhat subsided, the water was dropping rapidly and the line gave every indication of outriding the storm.

Second Storm Rages

But a second storm broke in the Big Tujunga mountains on Tuesday afternoon. This resulted in a second greater "run-off" and by Tuesday afternoon the stream began to rise rapidly. All during Tuesday night the storm continued and by Wednesday morning the stream had developed into a raging river. During Wednesday the waters cut the channel of the wash on either bank, widening it to a distance of approximately 150 feet. The gas line was immersed and

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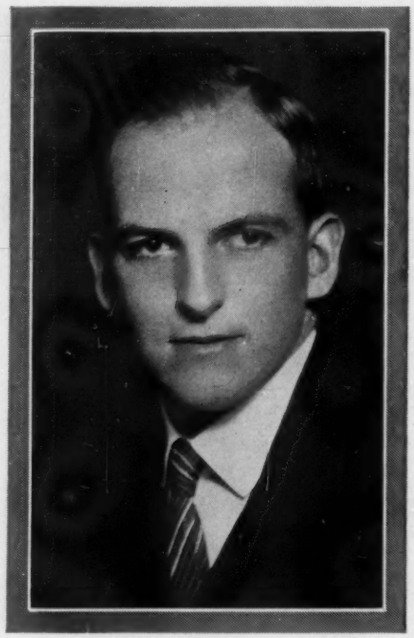
The Theory *of* Charcoal Adsorption

By A. J. L. HUTCHINSON

This discussion of charcoal adsorption was presented before a regular meeting of the California Natural Gasoline Association on March 31, 1926, and is to be followed by other papers on various modifications of the charcoal method of testing the gasoline content of natural gas as used in California. Mr. Hutchinson, author of the accompanying paper, is the research engineer of the Pacific Gasoline Company, Los Angeles.



A. J. L. Hutchinson

IT has been known for a long time that charcoal would take up large volumes of gases, but the commercial application of this property is relatively new. About 1900, Dewar in England patented the use of charcoal for producing high vacua. He sealed a bulb containing charcoal to the apparatus to be evacuated, heated the charcoal and pulled a vacuum on the apparatus with the usual types of pumps. He then cooled the charcoal down to a low temperature and obtained very high vacua.

War Hastens Research

Not much work was done on charcoal from this time until shortly before the war when it was found that different chars showed marked differences in adsorbing power. When the war came on and gas warfare became a reality it was necessary to produce some substance that would completely remove from air small traces of the war gas. As all of these gases are accumulative poisons even a trace passing through the protective device would be fatal. Chemical means could not be resorted to as the gas showed only one common property—being poisonous. From the previous work that had been done on charcoal, this substance was naturally turned to to fill the gap and extensive and intensive work was done on it with the results we all know.

The situation at the close of the war was—we were fairly well acquainted with the properties of charcoal, we knew how to prepare chars of high adsorptive capacity, and had developed an extensive surplus of raw materials. When the war closed the industries obtained the information gained by the government on charcoal and began putting it to use in their processes.

Since that time, considerable work done during and after the war has been published on the purely scientific side. The following is a brief abstract of the most important work done that bears on our present problems:

Theories Divided into Two Main Classes

The principles underlying the adsorption of gases and solids by charcoal and other solid adsorbents have been the subject of considerable study. From this study several theories have been evolved, none of which has been definitely proven to date. These theories can be divided into two main classes—one theory assumes the surface of the charcoal to be covered by a layer of highly adsorptive material; the other that adsorption is due to surface forces exerted by the surface layer of the charcoal molecules or by capillarity of the very small pores in the charcoal.

There are two conditions that lead to the theory that the surface of the charcoal is covered by a layer of highly adsorbing material. In the preparation of adsorptive charcoal the raw material is carbonized at a low temperature and treated at much higher temperatures with super-heated steam, air or a mixture of super-heated steam and air or other gases. This treatment distills out and oxidizes the heavy hydro-carbons that were formed during the charring period. It has been found necessary to stop this activating process before all the hydro-carbons have been removed. Some investigators have shown that the adsorbing power of charcoals they prepared was a function of the hydrogen content of the char, increasing with a decrease of hydrogen to a certain point and then decreasing as the hydrogen content was further decreased. This theory is more or less borne out by X-ray analysis of the charcoals which shows they are graphite with small amounts of hydro-carbons mixed with it. Specially treated graphite, free from hydrogen, shows marked adsorbing properties.

Charcoals thoroughly outgassed at high temperatures show a very high adsorption of oxygen which takes place at first very rapidly and then over a long period at a slow rate. On heating and evacuation only part of this oxygen is recovered as oxygen, the rest as carbon monoxide and carbon dioxide usually in molecular proportions. This has lead to the theory that adsorption is due to solution in a layer of solid oxide of carbon of the formula C_2O_3 or CxOy. This solid oxide of carbon has never been isolated and identified. If the above two theories are correct it seems unlikely that any other substance would show adsorptive properties; however, a large number of solids show this property, notably silica gel.

The "Surface Forces" Theory

The exponents of the theory that the adsorption is due to surface forces have much more evidence to support their theory. It has been shown that the amount of gas or vapor taken up by charcoal is a direct function of the surface of the charcoal. The surface of the charcoal is considered as the external surface and the internal surface of the minute capillaries in the charcoal grain. This surface has been calculated from a number of different results and gives for a highly activated charcoal a surface of the order of 10^5 sq. c.m. per gram of charcoal and a pore space within the charcoal of .6 cu. c.m. per cu. c.m. of charcoal. From this surface on the charcoal it is calculated that gases or vapors are adsorped in a layer one molecule thick.

This theory is clearly borne out by the fact that the vapor pressure curve at constant temperature of a vapor on charcoal is very close to a constant up to the saturation point of a monomolecular layer; it then makes a sharp break and gives an indication of hitting a constant value for the formation of a dimolecular layer.

The heats of adsorption have been studied and found that for like heats of adsorption the mass of gas adsorbed per square centimeter of surface is the same. This heat is much higher than can be attributed to the latent heat of the sub-

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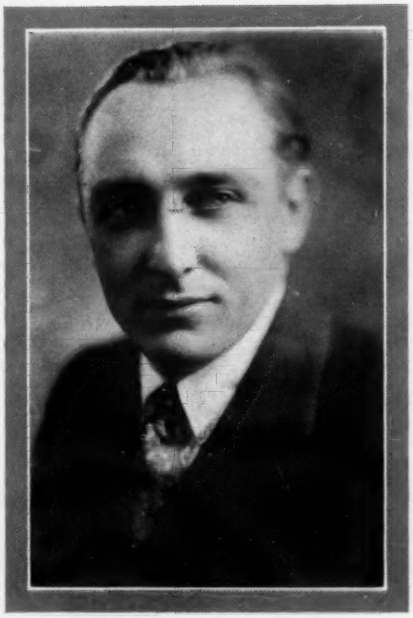

A. F. Rice

Some Effective Suggestions *on* How *to* Sell *a* Gas Range

By A. F. Rice
General Manager, Western Stove Company

DURING the latter part of the recently concluded course of lectures on the selection, use and sale of gas appliances, conducted in Los Angeles by the Gas Appliance Association of Southern California, Mr. Rice presented the lecture on gas range salesmanship published herewith. The lecture was enthusiastically received by the appliance students, and contains a wealth of hints on practical sales points. A few passages have been omitted on account of space limitations.

THERE can be no question but what there is, as in the case of any endeavor, a right or wrong way to sell a gas range.

Without resort to any particular criticism, taking the gas stove situation as it exists in Southern California, the degree of success is doubtful, for the reason that the average unit price of ranges sold is too low to permit a reasonable profit to either the manufacturer, jobber or dealer.

The reply to this may be that "It is impossible to raise the level of a market, where the popular demand is for the low-priced articles." To me that answer is clearly an alibi, not a reason.

While it is not my privilege to go into any detail concerning, "Appealing Window Trims," "Store Displays," or "Merchandising Plans," I do wish to emphasize a fact in this connection. I wish to proclaim in my most vehement manner that any employer who holds the belief that his salesmen can successfully sell gas ranges in any profitable quantity with only the aid of:

First: A consistent cycle of attractive, appealing window trims to arouse and maintain public interest;

Second: An intelligent merchandising plan broadcast by some efficient method, containing beside the specific advertising value promoted by the manufacture of the line he handles, the appeal of installment or term price, and the appeal of turning in an old range as part payment, and:

Third: A comprehensive, neat store display to intrigue the imagination of the prospect—

—such a dealer is more sound asleep than Rip Van Winkle and my subject in so far as that dealer and his unfortunate employees are concerned is being sown on barren soil; except that probably his beliefs may change or his employees may see light and seek connections where good gas stove selling practices are in vogue.

In the effort I am making you must be generous to the extent of using your imagination, for while I would like to have a stove actually standing beside me to play my little tune on, you must remember that this is a non-partisan organization, to promote no man's individual line. Therefore, after I have outlined the general basis of selling points on gas ranges to the extent of my ability, it is up to you to turn to the manufacturer of the line you are selling, to provide you with the selling data or sales points peculiar to that particular line. For this reason, too, it is impossible to fortify this lecture with illustrative slides.

Sell High Priced Units

In making the outline the theory is to appeal to Mrs. Shopper to buy the higher priced units in the line you handle. There could be no reason in making any effort otherwise, for to bear down on your lower priced units simply means a price proposition and the man with the lowest price, under such conditions makes the sale, and incidentally if he does enough of this kind of business, he makes an assignment to his creditors. And Mr. Salesman who resorts to this same practice must go forth and find himself another dealer to put out of business. Thus does the grim reaper, through low prices, collect his toll in the gas stove business. Whatever low prices and volume may mean in other lines, it surely means ruin to the retailer of gas ranges.

We are now face to face with Mrs. Shopper.

This is not a lecture of psychology, but how do you greet her? Do you stammer and sputter?

Do you grimance and think you are smiling?

In short are you at ease—in full control of your abilities?

You must be, for that is a prime necessity in selling anything.

Self control depends largely upon one important factor that is present in every deal, and the factor is the *motive* that actuates the parties involved.

We must assume that when anyone comes to you to buy, that party's *motive* is above suspicion. It is *your* motive that must be analyzed.

Are you actuated by the thought of profit only, or are you willing to earn your profit by offering a gas range you absolutely know to be worth the price you ask?

If you lack confidence in your article, either because of ignorance of its merits or because of known defects, and you are selling it because it can be bought cheap and sold high, there is no question but what you present a sorry spectacle in attempting to make a sale.

Know your pet gas range line thoroughly; cast aside those you know to be unworthy, and you are facing your prospect in full confidence and composure, because you have, even though it be sub-consciously, a *worthy motive*.

The Atmosphere

The next most natural step is to take your customer to your stove display. Here again I must dip into the display theory to state that, in my opinion, you should have on display one of the finest standard models of the line you sell. Not a novelty or freak, but a standard salable range—full porcelain—with thermostatic oven heat control. That particular model should be surrounded by as many of other sizes and trims as money and space will permit, but so placed that it is possible to seat at least three people comfortably, in full view of the range, and still allow you able room to conduct a thorough demonstration.

Corns, bunions and weary limbs, plus the nervous tension of a continued necessity to stand, creates an indifferent attitude that old grandpa salesman himself could not break through.

Ease, comfort, rest, puts your pros-

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PACIFIC COAST GAS ASSOCIATION

A Department Conducted by Clifford Johnstone, Executive Secretary

Convention Dates Set *for* Week *of* August 23

IT can now be definitely announced that the 33rd annual convention of the Pacific Coast Gas Association will take place in Pasadena during the week of August 23, with headquarters at the Hotel Vista del Arroyo. An inspection of the facilities offered by this hotel lead the officers of the Association to believe that no happier solution of the convention problem exists anywhere, as the Vista is ideal in every way.

The first meeting of the convention will open on the afternoon of August 23 and adjournment will come with the conclusion of the annual banquet on the evening of August 27. From now on the efforts of all of us will be directed toward providing a program which will be an inspiration to the gas industry.

The convention committee is now in the process of formation, and as the program is decided upon announcement will be made in these columns to facilitate the plans of members desiring to attend. The dates set are admirable, as they can be worked into the vacation time of many who could not otherwise leave their duties. All hotel reservations will be handled by the committee, as was done in Portland last year, and there will again be one entire day set aside for recreation. The golf tournament, which has become an institution at our conventions, will be played on the famous course of the Annandale Golf Club.

Northwest Conference, May 6 and 7, Portland, Ore.

ONE more sectional Association meeting remains before the annual convention; the membership of the Northwest is expected to turn out in force on May 6 and 7 for the Portland sessions. The Multnomah Hotel will serve as headquarters. Below is given the schedule of the meetings:

Thursday, May 6

Chamber of Commerce Rooms
Oregon Building
Corner 5th and Oak Streets

9:30 A. M. Meeting of Board of Directors, Room 703

2:00 P. M. Sectional Conferences:
Accounting Section, Room 703
Commercial Section, Room 705
Public Relations Section, Room 807
Technical Section, Room 701

8:00 P. M. Meeting of Appliance Certification Committee, Room 701

The morning of Thursday, May 6, is open for individual committee meetings, the initiative for calling these meetings resting with chairmen. The Secretary will endeavor to provide meeting rooms if the requirements are made known immediately.

Friday, May 7

9:30 A. M. General Meeting, Ball Room (Multnomah Hotel). "The Human Element and Actual Leakage," R. V. Wilson, Civil Engineer, Pacific Gas and Electric Company, San Francisco.
"Every One of Us Is an Accountant," A. E. Peat, Treasurer and Comptroller, Southern California Gas Company, Los Angeles.

2:00 P. M. General Meeting Continued. "Relations of the Industrial Load and Tariff Structure," L. C. Haffner, Industrial Engineer, Portland Gas and Coke Company, Portland. "From the Inside Out," D. L. Scott, Director of Public Relations, Los Angeles Gas and Electric Corporation, Los Angeles.

6:30 P. M. Dinner Dance, Ball Room, Multnomah Hotel. Informal, $1.50 per plate. Ladies expected.

1926 convention headquarters—the beautiful Hotel Vista del Arroyo, where Coast gas men meet on August 23

Tucson Meeting Inspiration *to* Southwestern Gas Men

THE joint meeting of the Pacific Coast Gas Association and the newly revived Arizona Utilities Association, held in Tucson on April 16 and 17, was an unqualified success. For several years the Arizona Association has been dormant, but now that a number of pressing problems have presented themselves to the Arizona companies they have seen the advisability of facing them together. If the spirit of friendliness and cooperation evinced at the meeting can be relied upon it can safely be predicted that these problems will be solved successfully.

The meeting was in the nature of an annual convention for the Arizona group and the progressiveness of the Arizona companies in public relations, home service and employee organization was a revelation to the Pacific Coast men in attendance.

A gratifying attendance contributed to the success of the meeting, including as it did executives from all Arizona companies and many of the larger companies in California. The prolonged and thorough discussion which followed each paper was especially notable. The program was as follows:

Thursday, April 15

2:00 P. M.
Meeting Arizona Utilities Association.

Friday, April 16

9:00 A. M.
Paper: "Promoting Good Will Through the Sale of Appliances," by A. F. Morairty, Sales Mgr., Central Arizona Light & Power Co.

10:00 A. M.
Reception Pacific Coast Gas Association delegation.

12:00 Noon
Luncheon with Kiwanis Club, Santa Rita.
2:00 P. M.
Paper: "Customer Ownership," by O. L. Moore, Mgr. Customers Department, Los Angeles Gas & Electric Co.
3:00 P. M.
Paper: "Coal & Water Gas vs. Oil Gas," by W. S. Dole, Gas Engineer, Federal Light & Traction Co., New York. Presented by Claude Webber.
3:30 P. M.
Sight seeing trip.
7:30 P. M.
Informal dinner dance at Tucson Country Club.

Saturday, April 17

9:00 A. M.
Paper: "Development of Lampblack Concentration," by W. C. Hornberger, Asst. Gen. Mgr. Central Arizona Light & Power Co., Phoenix, Arizona.
10:00 A. M.
Paper: "Applied Public Relations," by Don Ray, Mgr. Bureau of Public Relations, Pacific Gas & Electric Co., San Francisco. Presented by Clifford Johnstone.
11:00 A. M.
Paper: "Pipe Protection," by Dozier Finley, Research Engineer, Paraffine Companies, Inc., San Francisco.
1:30 P. M.
Round table open discussion.
4:00 P. M.
Adjournment.

An account of this meeting would not be complete without an account of the hospitality of the Tucson Gas, Electric Light and Power Company, under the leadership of Sam Headman and Claude Webber.

Pacific Coast men in attendance were: F. J. Schafer, president Pacific Coast Gas Association, and general manager of Southern California Gas Company, Los Angeles; F. S. Wade, vice-president and manager, Southern Counties Gas Company, Los Angeles; O. L. Moore, manager customers' department, Los Angeles Gas and Electric Corporation, Los Angeles; J. A. Harritt, superintendent gas department, San Diego Consolidated Gas and Electric Company, San Diego; W. M. Thompson, president Reliance Regulator Company; E. W. Langdon, Sprague Meter Company; K. C. Tomlinson, Pacific Meter Works; Dozier Finley, Paraffine Companies, Inc.; Frank Packer, Welsbach Company; Jay E. Jenkins, publisher of *Western Gas*; Clifford Johnstone, executive secretary Pacific Coast Gas Association, and H. L. Spencer, Geo. M. Clarke Company.

Geo. Wehrle represented the Public Service Company of Colorado, Denver; E. C. Deal, the Federal Light and Traction Company, New York City.

Among Arizona men attending the sessions were: E. H. Coe, W. C. Hornberger, L. Y. Woodmansee, C. T. Yates and A. F. Morarity, of Phoenix; M. V. Watson, Prescott; William Mitchell, W. S. Sutton, Globe; F. Roark, Nogales; R. F. Smith, Douglas; I. A. Ro-

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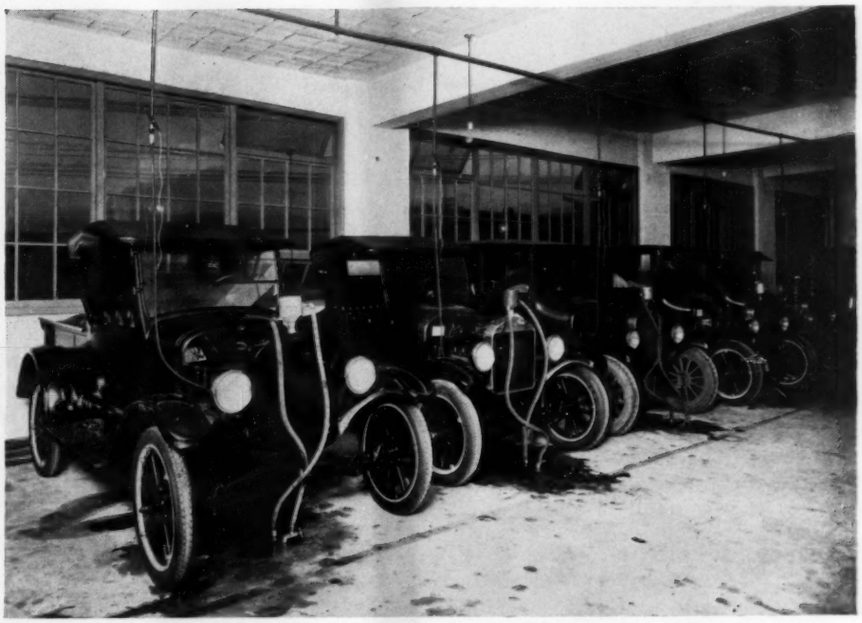


B. C. Electric Railway Co. gas is turning these new motors

Vancouver Gas Found Ideal Fuel *for* Breaking *in* New Motors

By J. Fremont, Gas Department
British Columbia Electric Railway Co., Ltd.

THOSE who have driven a new automobile remember the care they had to exercise in travelling the first few hundred miles and the stiffness of the engine, until it was broken in. Many visits to the garage had to be made for trifling adjustments before the motor got into its stride and became a pleasure to drive.

Here is the way the Vancouver Motors, Ltd., our local Ford and Lincoln dealers, have overcome this difficulty, at the same time boosting the consumption for our gas department. New cars are not run under their own power until the motor is in proper condition and all parts working smoothly. This process, which is called "running in", is now done with city gas in place of gasoline.

A Fordson Tractor with special equipment is used to haul the new cars from the unloading platform at the railroad to the Vancouver Motors Building. Here the motor is filled with the correct amount of high grade cylinder oil and a connection made to carry the exhaust outside the building; water connections are also made to the radiators to maintain the proper temperature.

The gas line is run overhead with outlets to provide for nine cars, each connected by flexible tubes to special jets on the carburetors. The motor is started in the usual way and allowed to run continuously until all parts are operating smoothly. At least eight hours are required for this process but the car is left on the line longer, if necessary. The use of manufactured gas for this initial run has many important advantages over gasoline. Being of slow combustion, it does not exert any undue strain on the moving parts of the motor which are assembled to a very fine degree of accuracy at the factory and can only be made perfect by this gentle running in process. Gas is clean and dry, and combustion being complete, no carbon is deposited on the pistons and valves, the dry gas cannot cut or destroy the delicate film of oil on the cylinder walls, which is an essential factor in preventing scoring or damage to these parts.

In view of the fact that it is anticipated over half a million cubic feet annually will be consumed by the plant, further developments along these lines should materially increase the gas output.

C. M. Grow Appointed Chairman of Commercial Section

CHAS. M. GROW of the Southern California Gas Company has been appointed by President Schafer as chairman of the Commercial Section of the Pacific Coast Gas Association to fill the vacancy caused by the death of T. J. Protheroe. F. M. Banks, also of the Southern California Gas Company, will take Mr. Grow's place as chairman of the Industrial Sales Committee.

EDITORIAL

A Bouquet to California Utilities

SECRETIVENESS has little place in modern gas utility operation. Exchange of information between companies is the accepted practice, and examples of cooperative research, in and out of gas association projects, are numerous. Lester S. Ready, chief engineer of the Railroad Commission of the State of California, paid gas utilities of that State an unreserved compliment in a recent contribution to the Journal of Electricity, when he pointed to the California Gas Research Council as a splendid example of the effectiveness of inter-company cooperation for improvement of service and increase of efficiency. Says Mr. Ready:

> "The results of this wholehearted, frank and open discussion of problems between these utilities, directly from the research carried on and indirectly through the more enthusiastic efforts which have been developed within the utilities in the improving of their service, have been worth much more than the cost."

Concluding his remarks Mr. Ready calls attention to the prosperity of California gas companies, and offers it as his opinion that co-ordination of effort among the utilities, in California and elsewhere, has been a big factor in the general progress made in the gas industry in the past decade.

What Impresses John Doe?

THE Man on the Street has come in for more than his share of maligning as an unappreciative user of utility services. Perhaps some of the trouble lies in a failure to analyze this generalized individual, the Man on the Street. After all, he's just an average fellow—not a gas enginer. He doesn't know so much about a B.t.u., and it's even doubtful if he can read a gas meter, unless he happens to be an industrial consumer. Busy with his own interests he leaves the gas company pretty much to itself, until a service interruption comes along, or the water heater develops internal troubles. Then the gas company comes in for abuse.

Where many companies still fall down is in failing to bestir themselves before they are on trial in the consumer's mind. Many a favorable impression must be registered to build up a bulwark of good feeling in the mind of the Man on the Street.

And these impressions must be made in terms that he can understand. If the gas company is finally to rid the consumer of the idea that it is merely an institution, it must show its human side to the consumer. Companies fortunately are coming to learn to talk personalities, to tell the public stories of service instead of merely statistics—in short, after all these years they are learning how to get under the skin of the Man on the Street.

A Place for Women

MISS LILLIAS DESPAIN, who holds the somewhat unusual title of Dean of Women in the Utah Gas and Coke Company of Salt Lake City, writes an article in this issue describing women's activities within her progressive company. *Western Gas* would welcome more contributions in this field of women utility workers, for women after all are in a position to make a real contribution in many phases of the industry. Most of the utility's contact with domestic consumers is with the lady of the house—and the gas company does well to fortify itself with woman's understanding of her own kind, through women employees. This is not to say that women are limited to contact work, valuable as that is, for there are several eminent examples of capable women executives in the gas industry. Other companies might profitably give some thought to putting their women's department on an efficiency basis.

Some Producer!

IN A late issue of the Washington Post we read some startling percentages on United States production of a number of leading commodities. Of the world's total output the United States produces 55 per cent of the iron ore, 62 per cent of the petroleum, 43 per cent of the coal, 55 per cent of the cotton, 95 per cent of the automobiles—and the list could go on at length.

Another story might have been appropriately added to this of United States leadership in commodity production. American gas utilities serve an estimated population of 52,000,000; during 1925 they produced a rough total of 500,000,000,000 cubic feet of manufactured gas; hardly a major industry exists in which gas is not an important production factor.

PACIFIC POWER AND LIGHT CO. EARNINGS SHOW GAIN

For the three-month period ending February 28 the Pacific Power and Light Company, with headquarters at Portland, Ore., showed a 22.2 increase in net earnings over the corresponding period the year previous.

POCATELLO GAS AND POWER CO. APPLIES TO DECREASE RATES

Water heating, house heating and industrial rate schedules have been filed by the Pocatello Gas and Power Company with the Public Utilities Commission of Idaho, the new rate being a material reduction.

PACIFIC GASOLINE TO HAVE REPRESENTATIVES AT TULSA MEETING

B. F. Masten, chief engineer, and R. E. Cameron, superintendent of the northern division, of the Pacific Gasoline Company, will leave Los Angeles on May 2 to attend the Tulsa Convention of the Association of Natural Gasoline Manufacturers.

MILLION DOLLAR PIER CONVENTION HEADQUARTERS FOR A. G. A.

Official announcement has come from the American Gas Association of the selection of the Million Dollar Pier, Atlantic City, as headquarters for the eighth annual convention and exhibition of the Association, dates for which are October 11 to 15. Fifty per cent more exhibition space will be available than was the case last year, according to the Association.

ROAD DRESSING PRODUCT FROM GAS IN PORTLAND

One of the city commissioners of Portland, Ore., has recently advocated to the city council that a tar by-product of gas manufacture, produced by the Portland Gas and Coke Co., be used for the macadam roads of the city, in place of the crude oil dressing now employed. Since 62 miles of city streets are renewed each year with a dressing, this would represent a good order, if landed by the gas company.

TUCSON GRANTS FRANCHISE TO COMPANY BY 2 TO 1 VOTE

Citizens of Tucson, Arizona, came to the polls on April 9 and by the decisive vote of 1166 to 602 gave sanction to the 25 year renewal of franchise asked by the Tucson Gas, Electric Light and Power Company. The balloting was much heavier than had been expected, indicating general interest in the issues at stake. On April 14 the city council met and formally granted the franchise.

APPLIANCE MEN OF SAN DIEGO HEAR LOS ANGELES SPEAKERS

Geo. Finney, secretary of the Gas Appliance Association of Southern Califonia, and H. L. Boyd, secretary of the Southern California Retail Hardware Dealers Association, spent April 15 and 16 in San Diego, appearing before the local unit of the Hardware Association. A number of slides used in the recently concluded Los Angeles gas appliance course were shown, and some of the contents of the course given, with the result that the San Diego men were interested in organizing a local unit of the Gas Appliance Association. J. A. Cooley, their secretary, was authorized to proceed with the organization.

WET GAS WELL BROUGHT IN AT TURNER VALLEY FIELD

Southwest of Calgary, Alberta, in the Turner Valley Field the Illinois-Alberta Oil and Refining Company has brought in its No. 1, Section 12-20-3w5. showing a wet gas flow of approximately 2,000,000 feet a day.

Gas Appliance Exhibit in Municipal Auditorium, Oakland, California

Food Show Benefits Oakland Dealers

By H. Elliott Taylor

MEMBERS of the Oakland gas appliance fraternity had handed to them on a silver platter the best and most timely tie-up for their own special week that the strongest cooperationist could have ever hoped to conceive.

Coincident with the display, dated April 11 to 17, when the gas men were showing the world the latest and best in gas-burning appliances, the retail grocers' association members of the same locality, were displaying the latest and best in food products.

The food show, under the name of the Second Annual Food and Household Appliance Show, was held in the big Municipal Auditorium, and was participated in by something over 150 exhibitors. Better than 100,000 people viewed the exhibition, and of these it is safe to say that about an even hundred per cent visited and tarried in the long corridor that was devoted exclusively to gas appliances.

P. G. & E. Takes Space

The Pacific Gas and Electric Company took a large space at the entrance to the Gas appliance row and fitted out a complete rest room, with phonograph or radio music to enable those who would to rest in comfort.

The general broad outlines of the campaign as laid down by the society in advance of gas week were followed by the Oakland group, but certain innovations were added here and there to the end that the story of gas should be sold into the Oakland homes in a thoroughly convincing manner.

A Dealer Exhibit

The Oakland show was strictly a dealers' exhibit, and every space used was paid for by the local firm which contracted for it. Twenty dealers cooperated in maintaining booths, and the trade names of about 65 manufacturers of appliances were in evidence.

One of the best drawing cards of the program was the daily cooking school, conducted during the entire week. A total attendance of about 1800 women was recorded at these daily lectures and demonstrations, which were under the general direction of Mrs. A. V. Farnsworth, home economics expert connected with the P. G. & E.

So that the advertising incidental to seeing the range in operation might be fairly distributed over all the manufacturers, two different makes of stoves were on the platform at every class period.

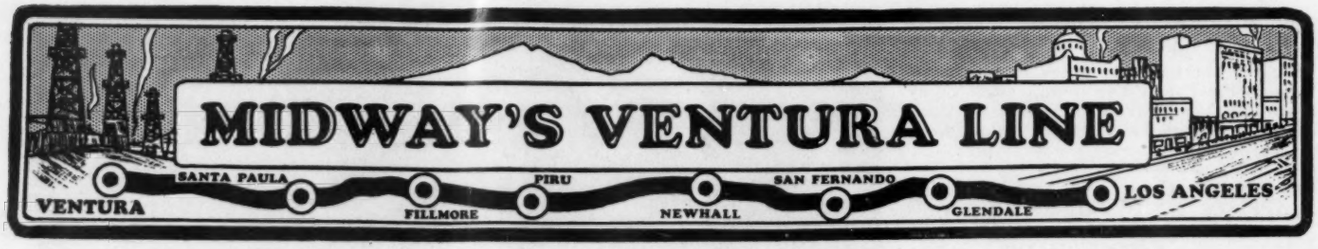
It goes without saying that the dealers represented in the show were able to materially swell their prospect lists, and many direct purchases were reported.

Cooking Competitions

Following the ideas of the committee in charge of the display week in the entire territory, the camp fire girls and the various domestic science classes in the high schools were given an opportunity to compete for prizes offered, and to act as advertising managers of the stores during the week.

In order that the cooking competitions in the schools would be conducted on the most modern type of equipment, a new temperature control stove was temporarily installed in each one of 20 domestic science departments. This expense was underwritten by the Gas Appliance Society.

An interesting sidelight on this general installation, and a fact that is indicative of how thoroughly the pupils in the cooking classes were sold on the better type of equipment was brought to light here. In one of the departments the girls enrolled in the course requested the school board to purchase the new stove that had been installed. But no funds were available. This being the case the class purchased the stove and presented it to the school. Some kind of entertainment is planned to raise the funds that were advanced for the purchase.



Constructing *a* Million Dollar High Pressure Natural Gas Transmission Line

William Moeller, Jr.
General Manager
Midway Gas Co.

The Technical Construction Story of the Midway Gas Company's New Fifty-two Mile Welded Pipe Line, Tying the Ventura Natural Gas Fields into the Company's Distribution System.

By WILLIAM MOELLER, JR.

THE natural gas engineer, like the surgeon and the student of military defense, must place unswerving faith in diagnosis.

A decision to build a costly transmission line, or to operate upon a patient, or to plan an elaborate system of coast defense, involves no inconsiderable element of chance. There is no foreknowledge that the disease assumed to be the one attacking the patient is the actual malady; there can be no way of knowing whether the enemy will strike at one seaport or at another, by water, by land, or by air; and, similarly, there is no certainty that the life and obtainable output of a gas field will in any measure justify necessarily heavy expenditures of money and effort.

The gas engineer must serve the community, as a military tactician must safeguard it. An error in either event will mean loss to the people, and, possibly, dangerous loss. Engineering judgments, with military judgments, are almost always debatable. The resolutions of the natural gas engineer are, of course, doubly devoid of certainty, dealing as he must with factors at once unmeasurable and tentative. But, once such decisions are made, no measure can be spared that will insure the execution of the original plan to the tenth place of decimals.

Planning the Project

This, to a limited degree, has been the situation involved in the laying of Midway's Ventura pipe line. There appeared to the Company's engineers a certain reasonable assurance that enough gas could be piped from the field in question to justify the expenditure of the million dollars that construction would call for. On this supposition plans were made, the compressor station erected, and the entire line completed in a time believed to be a record in the annals of the industry.

Throughout construction, rigid precautionary measures were taken, and excerpts from an engineering report of operations are appended:

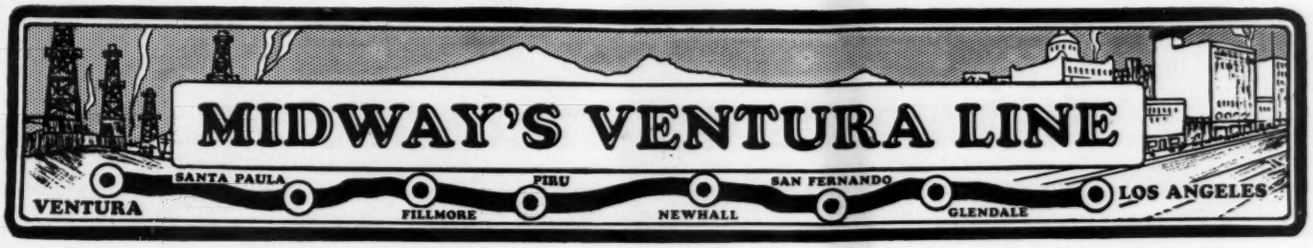
The line extends its 52 miles from the compressor plant on the General Petroleum's Barnard Tract on Ventura Avenue, through Ventura, Santa Paula, and Fillmore to Castaic, where it joins the Midway's double transmission line from Taft to Glendale.

The pipe used was of 12¾" outside diameter, weighing 29.44 pounds to the foot (except for pipe laid in the city of Ventura, weighing 33.37 pounds per foot.)

Before leaving the tube mills, and during manufacture, every piece of pipe was minutely inspected. In the final tests the pipe was subjected to continual hammer blows, while under hydraulic pressure of 550 pounds. The effectiveness of such tests was conclusively indicated by the fact that, in the final test of the line after installation, not a defective pipe was found.

Center ditcher at work just east of Saticoy Road

All pipe was supplied by the National Tube Company from their mills at McKeesport, Pennsylvania. The majority of shipments were by rail, in order to avoid the delays of the water route. Approximately 297 tons were shipped by boat to Wilmington, and from there trucked to the job. It was found that the condition of such shipments was not good, the pipe being dented and damaged to a certain extent. The remainder, 4,023 tons (107 carloads) came by rail. Here it was possible to make deliveries at each end of the line, and at five intermediate unloading points, thereby shortening the maximum haul for the trucks to about eight miles. The pipe was unloaded from the cars onto trucks by the aid of a gin pole and small truck. The trucks were not loaded to capacity except on the longest haul, when fifteen pieces would be carried, as the time lost preparing a heavy load was not justified by the extra pieces carried. On a whole, it was found that from the viewpoint of speed, delivery convenience, and condition of pipe, rail transportation more



than offset the additional cost of land over water shipments.

Locating the Line

Preliminary location work was started on August 12, 1925. It was found necessary to detour in the towns of Ventura, Santa Paula, and Fillmore, in order to avoid traversing highly improved or heavily congested districts. An alternate route around Ventura was located through the hills. Although this proposed route, some four miles in length, was shorter by about two miles than the route through Ventura, it was abandoned on account of the high construction cost, anticipated high maintenance cost, and inaccessibility during wet weather, due to the nature of the country through which it would have to be laid. The final location of the line, with the few exceptions mentioned, extends along the highway throughout its length, at varying distances of from two to 10 feet from the edge of the pavement.

The White Truck and Transfer Company handled the hauling and stringing of pipe, using five-ton trucks. In unloading from cars to the trucks, temporary platforms were erected at the side of the cars, holding a truckload of pipe. In this way the car unloading crew, consisting of three men and the driver, continued to unload pipe, in the event of a truck being delayed in returning for another load.

Handling the Pipe

In handling the pipe from cars and from trucks along the right-of-way, it was necessary to exercise considerable care, so as not to flatten or otherwise distort the shape of each joint. Each piece was skidded down; a man at each end lowering gently in position with the aid of a short piece of rope.

Considerable interference from traffic was experienced from the pipe line being so close to the paved section of the highway. From five to seven miles of ditch were always open, because of the speed maintained in prosecution of the work. Several accidents took place, which caused the establishment of uniformed patrols to control speed of traffic and safeguard the workers.

The maximum amount of pipe unloaded and strung in one day from a single railroad siding totaled four carloads, extending over approximately two miles.

Excavating was handled whenever possible by machine. Where conditions would not permit, such as the presence of boulders and rock, or limited space along right-of-way, hand labor was used. In trenching for the pipe, 128,800 lineal feet of trench were excavated by machine, and 142,100 feet were dug by hand labor. It was necessary to tunnel under all paved highway and railroad crossings, an aggregate of 1,124 feet of tunnel work being thus carried out, which will be described later. In laying the line, a trench 18 inches wide and 40 inches deep was excavated. Different types of excavating machines were used, one being a side and the other a center excavator. In handling the dirt, one was as good as the other, but the center digger was easier to keep in working order. This fact was due to the unbalanced strains of the side trencher, which were not present in the other type. In point of adaptability to the work, the side trencher was preferable. The excavating member, being at the side of the machine, could get close to the embankments as in cuts, or in an abrupt drop at the edge of a fill. For these reasons the side excavator was used at the Castaic end, where conditions similar to those described were experienced.

Passing a manhole by welded offset. Pipe is newly painted

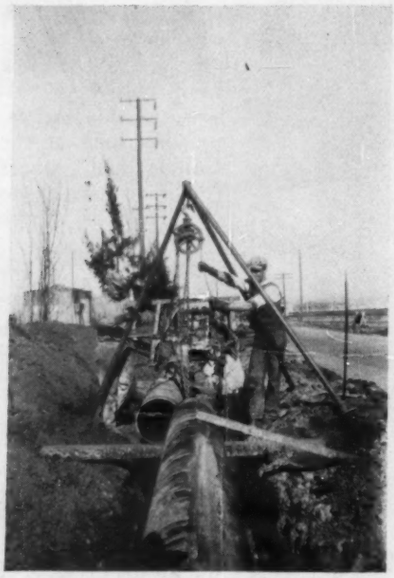
The crew of the digging machine consisted of three men. The maximum amount of ditch which could be expected from one machine in one day, where going was good, was 2,500 feet. Much of the route was heavy digging, due to the presence of boulders. In other places there were numerous obstacles, such as irrigating pipe, culverts, etc. A total of 700 lineal feet was often a good day's work under these adverse conditions. With hand labor, one man with pick and shovel could dig from 50 to 100 feet of ditch in one day, depending on the nature of the right-of-way.

Tunneling

Tunneling operations were necessary or advantageous in crossing railroad tracks and certain pavements. This operation was carried on in the following manner: The work was done by two subcontractors, whose procedure was the same. The equipment consisted of an automobile, a Cadillac in this case, which supplied the power to operate the drills, as well as supplying transportation. The car was backed into position with the rear axle over and parallel to the proposed pipeline. One wheel was jacked up. Power from this wheel was

Unloading the shipments of pipe from flat cars onto trucks near Fillmore, California

transmitted to a reduction gear in the bottom of the ditch through a shaft and two universal joints. The drill stem was fastened to the low speed side of the reduction gear. In drilling, the practice was to drill a four-to-six-inch hole first, this hole acting as a guide or pilot for the larger cutter. The drill stem was in sections, and was lengthened as required. In tunneling for this job, a hole large enough for the placing of a



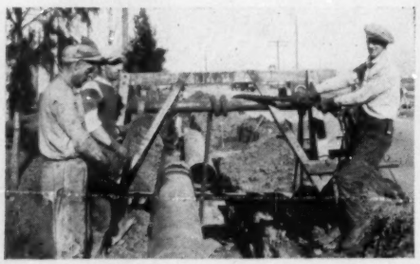
Lowering pipe into trench by means of tripod and chain block

sixteen-inch pipe was made. The operating crew consisted of two men. The average speed on this work was about three and a half feet an hour, i. e., a forty-foot tunnel which included the placing of the pipe would require, on an average, 12 hours.

Back filling in the main was handled by two caterpillar tractors fitted with blades in front. Hand labor was required in towns, where it was necessary to wet down and tamp the refill. The fills were finished off by rolling down and scraping off the surface.

Organizing for Construction

Construction work on the job, with the exception of the hauling of the pipe, was handled from headquarters established at Fillmore. Fillmore is about half way between Castaic and Ventura. With a paved highway running parallel to the pipeline for almost its entire length, little loss of time was experienced in operating from this central point. In handling the construction work two main crews were established, one starting at each end and working toward the center. Each outfit consisted of a Buckeye wheel ditcher, 18 welders, and necessary helpers. In the city of Ventura the work was carried on by two small additional crews, with four welders to a crew. This was occasioned by the fact that only three quarters of a mile of open ditch was allowed at one time within the corporate limits of the city of Ventura. In other places along the line, five miles of open ditch were allowed.



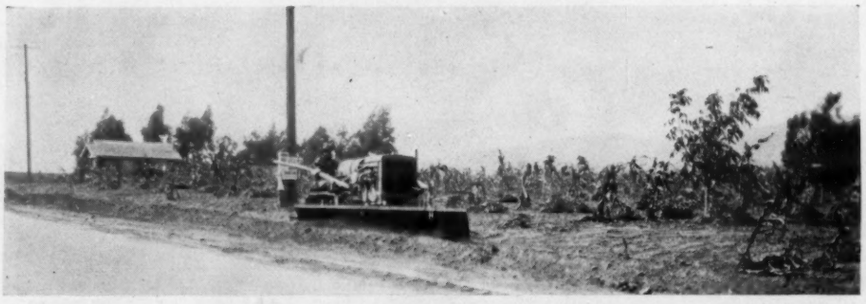
Lowering by use of pipe horse

Methods used in laying the pipeline varied, some being found better than others. A consideration of the various methods used, their advantages and disadvantages, and the reasons for discarding some of them, may be of value.

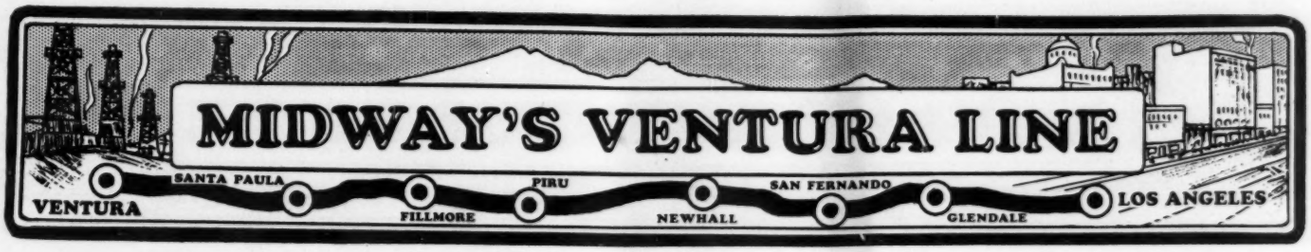
Under discussion was the advisability of a clamp to facilitate the welding of joints. The use or attempted use of various types of clamps had been made on other jobs. One was tried on this work. The function of the clamp is to assist in the lining up of two joints of pipe, preparatory to welding. The one used in this instance was a hinged sleeve, about 18 inches in length, which fitted over the two ends of the pipe. As more pressure was applied, the fastener for the sleeve, a concentric arrangement, squeezed the pipe the harder. When in place there were four holes in the sleeve, exposing the pipe edges, and at these four points the pipe was spot-welded. The clamp was then removed and the weld completed. This clamp did not prove efficacious, as it was not heavy enough to hold the pipe in place, and, too, obstructed the line of sight along the main. This is, of course, objectionable, and tends to slow up the work. The conclusions here at least are that, to line the pipe properly, the clamp would be so heavy and cumbersome as to be impractical.

Lining up and Welding

The line-up crew in this instance consisted of 10 to 12 men. They carried the joints in position, placing them on skids across the ditch, one being placed directly under the joint. These skids were raised and lowered, wedges being used to hold the pipe in position. The welders followed and made the welds. As much welding as possible was done on top of the ditch. In straight line work, welding proceeded until some barrier was encountered, such as a road crossing or a railroad track. Bends in the pipe, when not too sharp, did not stop welding on top of the ditch. Here it was necessary to exercise care, however, as expansion of the line might cause trouble in the lowering of the pipe into the trench, it sometimes being necessary to cut the pipe, and then reweld in the ditch. In welding the line, no bends were made, and angles were in no case of more than 45 degrees. Where welds were made in the ditch, it was necessary to dig bell holes sufficiently



Backfiller operating on Telegraph Road near Limonera Ranch, Calif.



The new welded steel pipe-line recently completed by The Foundation Company for the Midway Gas Company, bringing gas into Los Angeles from the Ventura Avenue Field, establishes a record for speed in construction, as well as efficiency in welding. This 12¾" O. D. pipe-line was laid for a distance of 52 miles and was turned over to the Gas Company 68 days after construction was begun, despite the fact that many difficulties arose to delay progress. On final Hydro-static Test of 500 pounds per square inch, **ONLY FIVE** welds proved defective out of 14,200.

THE FOUNDATION COMPANY

Office Buildings
Industrial Plants
Warehouses
Railroads and Terminals
Foundations and Underpinning
Filtration and Sewage Plants

SAN FRANCISCO

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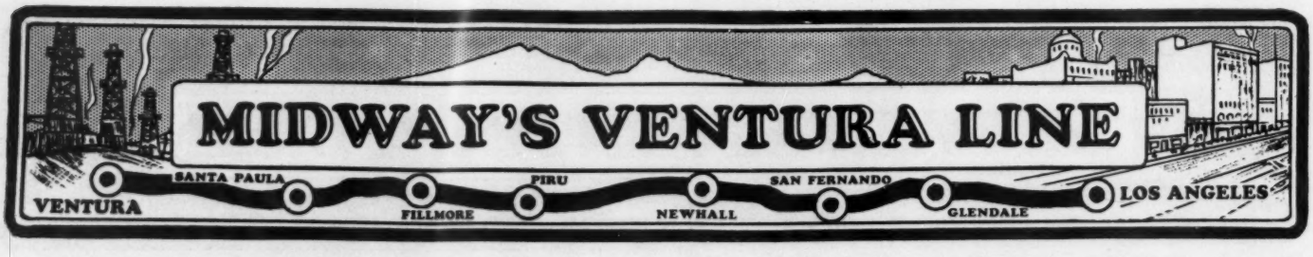
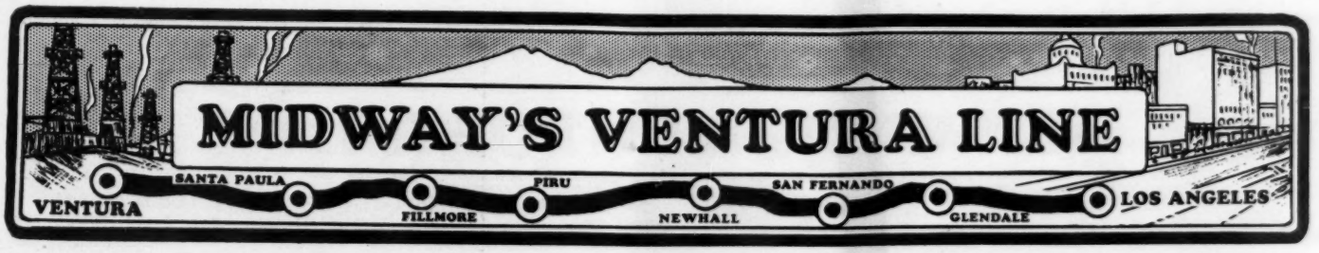
Hydro-Electric Developments
Power Houses
Highways
River and Harbor Developments
Bridges and Bridge Piers
Mine Shafts and Tunnels

BUILDERS OF SUPERSTRUCTURES AS WELL AS SUBSTRUCTURES


MIDWAY'S VENTURA LINE
VENTURA
SANTA PAULA
FILLMORE
PIRU
NEWHALL
SAN FERNANDO
GLENDALE
LOS ANGELES

COOPER



Midway's Ventura Plant Built with Cooper Engines

From an engineering standpoint, Midway Gas Company's Ventura Station could well serve as a model for practical compressor station layouts.

It contains twelve 170 B.H.P. Cooper Type-80 Gas Engines direct driving Cooper Compressors.

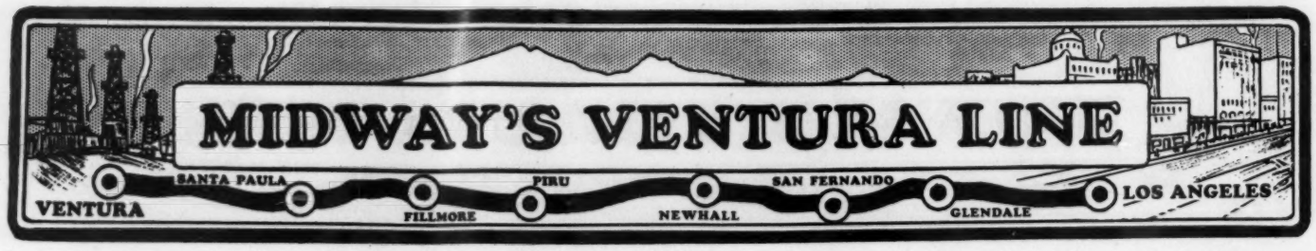
These engines are of the four-cycle type. They have been making friends in the California fields because of their fuel economy and greater reliability.

THE C. & G. COOPER COMPANY

MT. VERNON, OHIO

1605 Kirby Bldg., Dallas 504 Kennedy Bldg., Tulsa

317 Bank of Italy Bldg., Los Angeles



large to permit welding entirely around the pipe.

In this work, each man was expected to make at least 12 welds during a day of eight hours. An aggregate of 14,200 welds were made on the entire job.

The total amount of welding material used was 20,400 pounds of quarter-inch steel rod, 412,500 cubic feet of oxygen, and 406,000 cubic feet of acetylene. All oxygen and acetylene was delivered to the job in cylinders, no generators being used.

Painting the Pipe

The pipe was painted with three coats of a special coal-tar paint, applied cold with long-handled roof brushes. A six-hour interval was allowed between coats for drying. As applied, one gallon of the paint would cover about 160 square feet, one coat. Experiments were made by applying with a canvas but this process was found to be slower and more wasteful of paint. With the brushes, one man could paint about 220 square feet an hour.

In lowering the pipe into the trench, two methods were used; one by means of special pipe horses, and the other by chain block and tripod. When the work was nearing completion, one gang used the horses and the other the tripods, each believing their method to be the better. The horses used were of pine, about five feet long. Under the top member, supported at each end and on bearings, was mounted a four-inch pipe. In lowering the line, the horse was placed over the line and ditch. The four-inch pipe on the horse acted as a drum on which was wound a rope, raising or lowering being accomplished with lay tongs at each end of this four-inch pipe. The tripod and chain block were used for the same purpose. The tripod was handled more easily and had a greater spread at the base, thereby eliminating caving of the ditch walls. In lowering, a sling was placed around the pipe, remaining stationary during the operation, so that no damage was done to the coat of paint. The lowering gang consisted usually of 12 men. A possible advantage of the wooden horse is its greater ruggedness, accounted for by its simplicity of construction.

Valves, Expansion Joints

Authorities disagree in regard to the number and location of valves and expansion joints in long transmission lines.

In this instance valves were placed on each side of major bridges where the line was fastened to the bridge, at city limits where the main entered and left the town, and at railroad crossings.

At each valve a Dresser coupling was placed at the downstream side to take care of possible expansion or contraction of the pipe line. It was necessary for all valves to be securely blocked. If, during course of construction, it should be necessary to test an intermediate section of the line to maximum pressures, the sleeve would have to be firmly clamped in order to prevent movement of the line and valve. The clamp may later be removed after the test is completed.

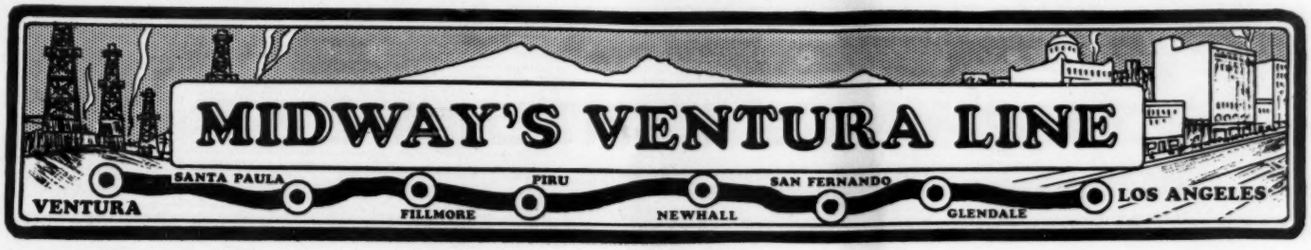
Showing pipe suspended from the floor beams of the Santa Clara River Bridge

The valves were placed in man holes seven and a half feet deep. Each 12-inch valve was fitted with a four-inch bypass with two four-inch valves, one on each side of the main 12-inch valve, and between these two four-inch bypass valves a four-inch bleeder or blow-off was installed to be used in case of emergency, to drain any section on either side of any main line valve. Where exposed to traffic, concrete manholes were constructed, six feet square, with cast iron covers; in other places wooden boxes with steel covers were used. All main line valves of the inside-screw type were installed in upright position, allowing operation outside the manhole by means of a key. These were furnished with Van Stone flanges and nipples. The main advantage of the Van Stone nipples is the elimination of threaded joints and the consequent reduction of liability of leakage. From a construction standpoint this joint may be installed much more easily and quickly than the old style connection. The movable flange of the Van Stone does away with the necessity of welding the connecting nipple in exact position to line up with bolt holes on the valve. Sixteen valves were installed.

Two major tests were made on the line. The preliminary test was made under air pressure of 125 pounds on sections of about one mile, the pipe having been welded and placed on skids on top of the ditch. Any defects or leaks were thus easily located and repaired. For this work a portable air compressor driven by a gas engine was used, handling 210 cubic feet of air a minute. Each one-mile section under the above-mentioned air-pressure test, was sealed at both ends with a "bull-plug"—either temporarily welded or attached with clamps.

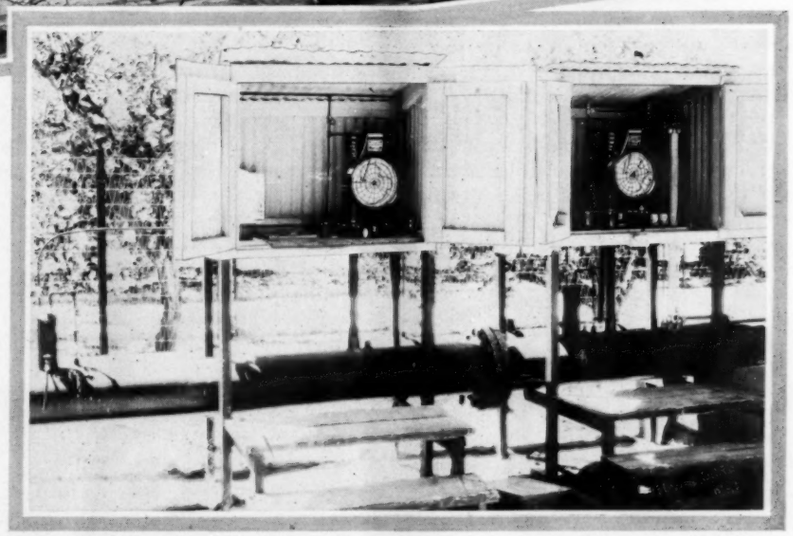
Final Test of Line

The final test was made after the pipe line was lowered into the trench and covered. These tests were made in sections of from 10 to 15 miles, hydraulic pressure being used. This pressure was furnished by two triplex pumps driven by one gas engine. The capacity of the high-pressure pump was 35 gallons a minute at 550 pounds pressure and that of the low-pressure pump was 70 gallons per minute at 300 pounds. A pressure of 300 pounds per square inch was maintained in actual test for three



Westcott Orifice Meter installation on the Midway Line at Ventura.

Compressor Plant at Ventura.

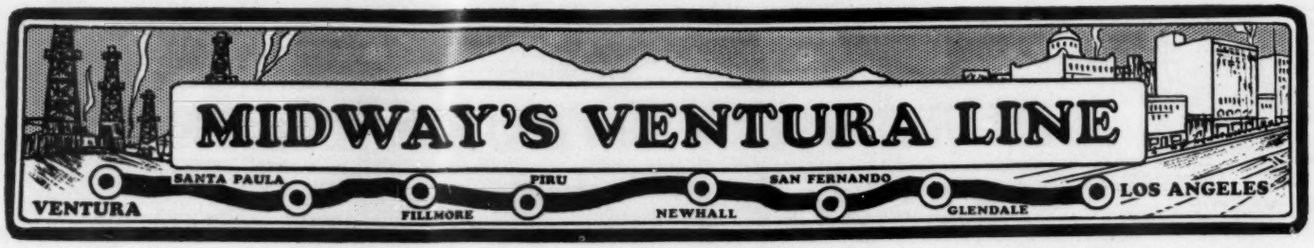


Close-up view of Wescott Orifice Meter installation on the Midway Line at Ventura.

(Pacific Coast Representatitives, Westcott & Greis, Inc., 1945 Santa Fe Ave., Los Angeles, Calif.)

WESTCOTT & GREIS

MEASUREMENT AND CONTROL



or four hours, the low pressure pump being then cut out and the high pressure pump operated until 500 pounds was attained, this being maintained until the end of the test. On the longer sections it took all of three and a quarter days to fill the line with water, expel the air, and bring the pressure up to 400 pounds. In about 20 minutes more the pressure was raised from 400 to 500 pounds. The first section tested was about 17 miles in length, its terminals differing in elevation some 400 feet. Two welds failed in this test at 340 pounds. Repairs were made with a loss of water in about one mile of line. In the second section tested, from Fillmore, 12 miles east, two welds failed at 460 pounds pressure, with a loss of water in about three-quarters of a mile of line. In the third section, over the 10 miles between Santa Paula and Fillmore, one weld failed at 460 pounds pressure.

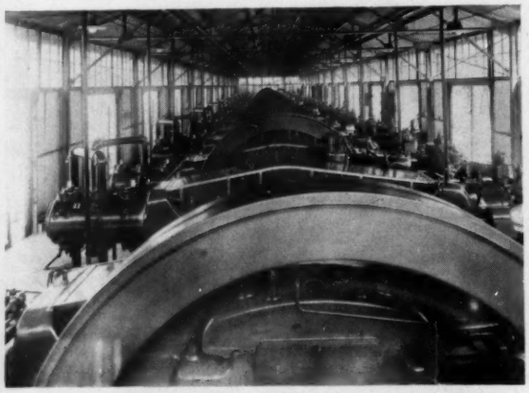
Expelling the Water

Some difficulty was experienced in removing water from the line after the test, and although 139 permanent two-inch bleeders were installed along the line, it was found necessary to cut the main in several places. After the final test, the compressor plant in the Ventura field was started, and air instead of gas was compressed and forced through the pipeline in order to assist in expelling water.

In the design of this pipeline, valves were located at intervals so that if repairs requiring the bleeding of the line are necessary at any time, a minimum amount of gas is wasted. The "inside screw" type of valve was used for two reasons: The fact that a minimum vertical distance is available in man-holes along highway, and the fact that this type can be operated with a key from the surface of the ground.

Compressor Equipment

The gas compressor plant necessary to compress the gas from the so-called "Ventura Oil Field" for transmission through this pipeline was constructed on the Barnard Lease of the General Petroleum Corporation on Ventura Avenue in the "Ventura Field." It consists of a main compressor building housing 12 gas compressor and auxiliary units necessary for their operation; a cooling tower to cool compressed gas and circulating water used in the gas engine cylinder jackets; a field office building, two dwellings, and a garage and warehouse for materials and equipment.



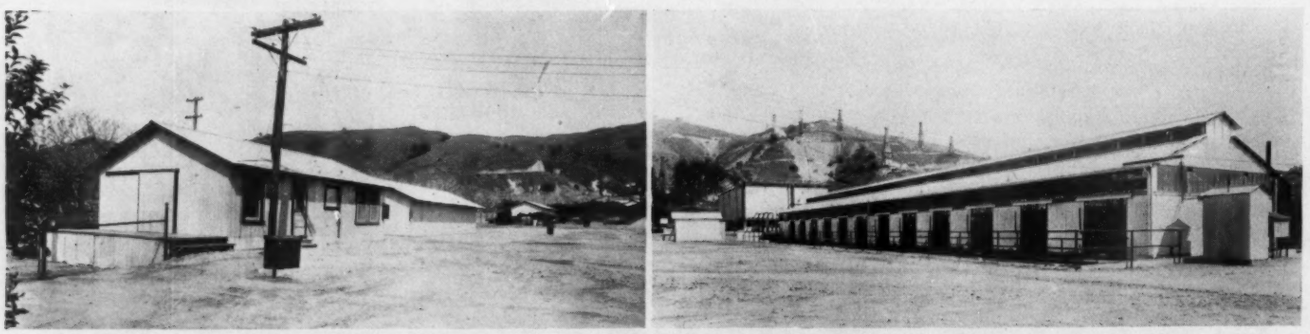
Interior of compressor station at Ventura, showing battery of twelve 170 h. p. Cooper units

Gas is received at approximately 20 pounds pressure from the gasoline extraction plants of the oil producing companies, and is delivered to the intake lines at the plant through suitable orifice meters which measure this output. The main compressor units are 170 horsepower, C. and G. Cooper Company twin direct-connected gas engine driven gas compressors, with two 18″ dia. x 20″ stroke power cylinders, and one 11½″ dia. x 20″ stroke low-stage compressor cylinder, and one 6¾x20″ stroke high-stage compressor cylinder on each unit. The maximum delivery pressure from these compressors is 300 pounds per square inch.

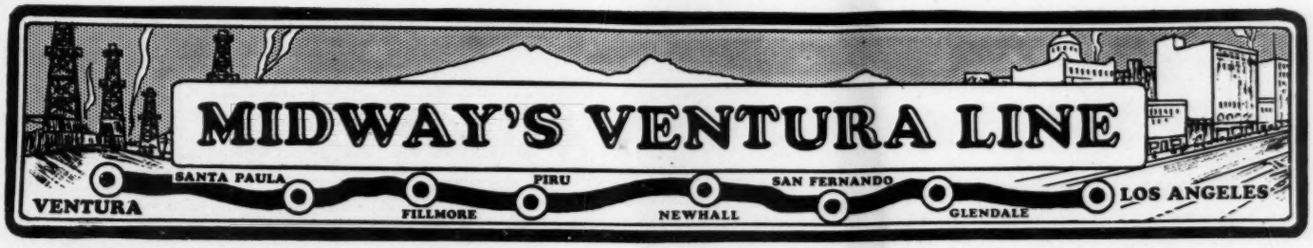
The auxiliary equipment consists of one 60 horsepower "Western" gas engine, belt-connected to two Number 5 Cameron centrifugal water pumps, one for circulating water through the cooling tower, the other for circulating cooling water through the "closed circulating system" for the gas engine cylinder jackets. This engine also operates a small Ingersoll Rand air compressor to provide air at high pressure for starting the main compressor units. A 9″x 8½″x10″ Worthington Simplex water pump was installed for circulating water and for high pressure fire services. This pump is operated by high-pressure gas instead of steam, the gas being taken from the high pressure gas main to the "steam cylinder," and the exhaust returned to the low-pressure intake line. This scheme permits the utilization of high-pressure gas without waste.

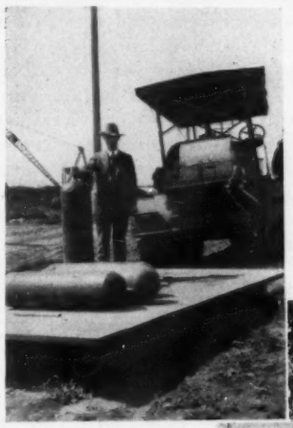
The Cooling Tower

The cooling tower is of the vertical type with a concrete tank base and wooden superstructure, warm water being supplied at the top and allowed to spray or drop through the tower. In



Exterior view of Ventura compressor station, showing compressor building, cooling tower, office building, warehouse, etc.





The patented cylinder that guarantees purity and uniformity to users of Commercial Acetylene.

Preparing to lower a welded section of the Midway's Ventura Line.

The best--and something more

True, only the best of materials were considered for Midway's "million dollar line," but the best and something more was required. It was necessary that Acetylene gas for example, that was used in welding this line, should be delivered right on schedule, cylinders spotted along the line ready for use, and the manufacturer ready at any time to meet unforeseen emergency demands.

Sometimes this is referred to as Service, spelled in heavy black letters,—it's an every day performance with Commercial. So in the construction of the Midway's Ventura line over one thousand cylinders of Commercial Acetylene were delivered during the construction period, without a single instance of a minute's delay.

Commercial Acetylene Supply Co., Inc.

417 Market Street, San Francisco

5600 Bickett Street Los Angeles

Applying MOGUL PIPE ENAMEL on the east section of the line.

To Protect

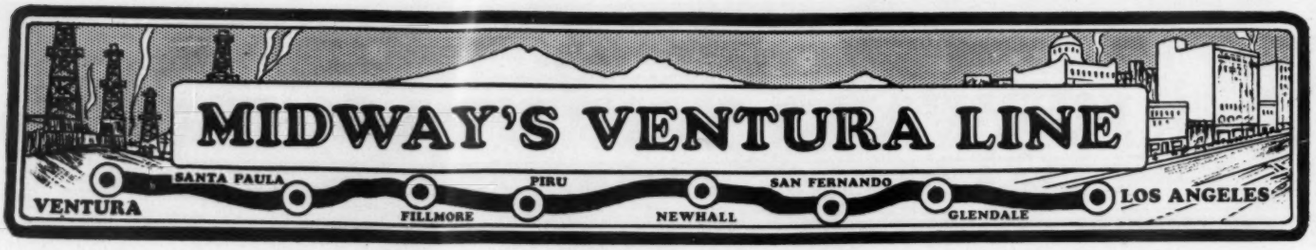
Midway's Ventura Line 350 barrels of MOGUL PIPE ENAMEL were used. Its selection by Midway for use on this enormous project is another tribute to the enduring preservative qualities of MOGUL PIPE ENAMEL.

Manufactured by

The Brininstool Co.

Specialists in Industrial Paints

LOS ANGELES, CALIF.



the tower is installed the so-called "closed circulating system" for cooling water circulated through the gas engine cylinder jackets. This system is recommended for the prevention of scale or sediment accumulation in the gas engine jackets. It consists of approximately 10,240 lineal feet of two-inch pipe placed in the cooling tower.

The compressed gas from the intermediate and high pressure compressing cylinders is cooled by coils placed in the cooling towers. These gas coils consist of approximately 11,000 lineal feet of two-inch pipe.

A De Laval centrifugal oil separator was installed to reclaim and recondition lubricating oil used by the main compressor units.

The fire fighting equipment consists of 10 two-inch fire hydrants, each having one hundred feet of fire hose, two 40-gallon Foamite tanks on wheels, and 12 two-and-a-half-gallon Foamite wall tanks.

The Gas Compressor Station

The main compressor house is of steel frame with corrugated galvanized sides and roof, well ventilated and with ample window arrangement to provide good lighting. The dwellings are of ordinary wood frame construction and the office, warehouse, garage, and sheds are of the conventional wood frame type with galvanized corrugated iron siding and roof. The entire property is enclosed by a steel wire fence.

The construction of the gas compressor plant was carried on and completed by the construction department of the Midway Gas Company. Work was started on September 21 and completed on November 15. This record time of 54 days bespeaks the efficiency of the Company's construction department. Approximately 60 men were employed during the peak period of work on the station.

A Construction Time Record

The construction of the Ventura pipeline was carried on and completed by the Foundation Company, acting as construction engineer for the Midway Gas Co. Pipe arrived September 15, 1925, and actual work on ditching and welding started September 21. The construction of the pipeline was completed on November 26, or within 68 days after actually starting on ditching work. During the peak of construction a total of 350 men were employed on the pipeline work.

The line was put in active service on December 2, 1925, just 78 days after the arrival of the first car of pipe, and both the pipeline and compressor plant have been in uninterrupted and full operation ever since.

The cost of this entire project was slightly under one million dollars. Such an expenditure attests the Midway's faith in the judgment of its engineers and remains a testimonial to the efficacy and justification of rigid precautionary measures, intensive construction and engineering courage.

Tucson Meeting

(Continued from Page 21)

sok, H. L. Robinson, Stanley Jewell, Bisbee; G. P. Harington, Flagstaff; F. L. Beuhman, Jerome; A. N. Jones, Clarkdale; B. W. Steinert, Winslow; C. H. Webber, Herbert Painter, Nathan Robbins, Sam Headman, W. W. Nielson, Philip Drachman, and Russell Sanford, Tucson.

New P. C. G. A. Members

ASSOCIATION memberships continue to come in to the Secretary's office at a good rate. Here are a number received since the last announcement of new members::

CLASS B, MANUFACTURERS

Pacific Coast Heating Co., Inc., 1282 Delaware Street, Berkeley, Calif. Represented by Geo. P. Schmitt, Heating Engineer.

Power Heat Regulating Co., 1808 West 8th Street, Los Angeles, Calif. Represented by A. W. Powell, Mgr.

Westcott & Greis, Inc., 1945 Santa Fe Avenue, Los Angeles, Calif.

CLASS C, INDIVIDUALS

Wm. Barents, L. O. Johnson, Los Angeles Gas and Electric Corp.

P. MacDonald Biddison, Gas & By-Products Co., Box 413, Bastrop, La.

L. L. Biggs, Southern California Gas Co., Glendale, Calif.

W. E. Chambliss, C. E. Holt, Pacific Gas and Electric Co., San Francisco, Calif.

Ben F. Hawes, Pacific Gas and Electric Co., Marysville, Calif.

Wm. H. Hermes, Black & Penn Sales Co., San Diego, Calif.

J. A. Johnson, JNJ Firebrick Construction Co., San Francisco, Calif.

L. R. Stubblefield, Geo. L. Works, Pacific Gas & Electric Co., Fresno, Calif.

Charcoal Adsorption

(Continued from Page 18)

stances and is equivalent to the heat of compression of the liquid to 37,000 atmospheres pressure. This is of the same order of magnitude as the forces in the carbon carbon linkage.

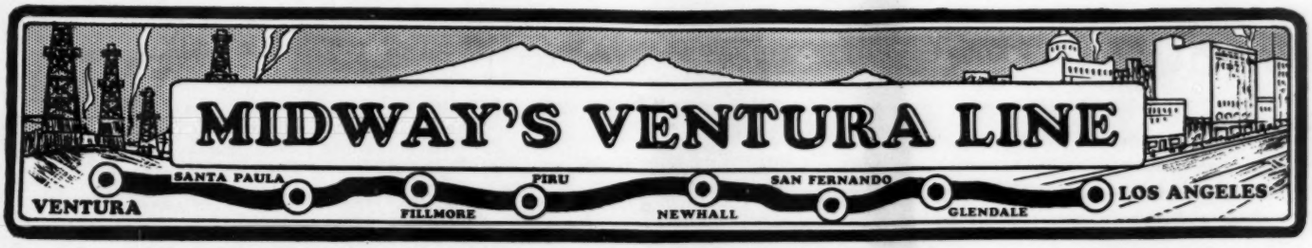
This has lead to the theory that the adsorbed film was held by the free valances of the oriented surface layer of carbon molecules.

A calculation of the capillarity of the small pores of the charcoal, which are sub-microscopic and their diameters of the same order of magnitude as molecular diameters, gives vapor pressures that follow closely the observed vapor pressures for some substances and almost exactly for water. By very careful work it has been shown that water is held on charcoal solely by this capillary action while other substances more closely follow the theory of free valences.

The effect of the presence of one gas adsorbed on charcoal on another gas is dependent on the solubilities of the two gases in the liquid state. If the two liquids are mutually soluble the saturation point is slightly higher than for one of the gases alone. If, however, the two gases are insoluble in the liquid state, the presence of the one gas will retard the rate of adsorption of the other, but will affect its equilibrium point very slightly. When two gases are passed through charcoal to the saturation point of the charcoal the charcoal shows strong selective properties. As a general rule the gas having the higher critical temperature will displace from the charcoal the gas with lower critical temperature. This displacement is not complete but follows the law of mass action.

In a gaseous mixture of hydro-carbons of an homologous series such as natural

(Continued on Page 40)



Roebling Welding Wire

Used Exclusively

Played an important part in the successful building of this line

Roebling Low Carbon Electric (Arc) Welding Wire
Roebling High Carbon Electric (Arc) Welding Wire
Roebling Manganese Electric (Arc) Welding Wire
Roebling American Iron Acetylene (Gas) Welding Wire

Carried in stock by

John A. Roebling's Sons Co. of Cal.

216 South Alameda Street **LOS ANGELES**

We Strung the Pipe and Hauled the Machinery and Equipment

Phone
FAber 0345

WHITE TRUCK AND TRANSFER Co.

808½ E. 7th St.
Los Angeles, Calif.

We Specialize in Pipe Line Transportation and Heavy Trucking—Fleet Service

People's Lumber Co.

—Incorporated 1890—

Pioneer Lumber and Material Dealers

MAIN OFFICE, VENTURA

Convenient Branch Yards

Oxnard, Santa Paula, Fillmore, Ojai, Moor Park, Santa Susana, Hueneme

We Own and Operate Our Own Brick and Tile Plant

We know what service means to our customers. Give us a trial order.

The Advertising Columns of

WESTERN GAS

Carry important messages to our readers from the foremost concerns serving our industry.

When Writing to Advertisers Mention WESTERN GAS

Suggestions *on* How *to* Sell *a* Gas Range

pect in a receptive mood. You should provide this essential atmosphere.

A varied display confined to a very limited number of makes offers a selection and carries evidence of successful stove merchandising. You should provide it.

The Appearance

Who of those amongst us have words capable of creating a selling talk on beauty. Only the eye can fully comprehend beauty. A word picture may be very excellent indeed, but my observation leads me to advise that you do not attempt to rave over the beauty of the range you sell. Call attention to it, by all means, but in a simple, unaffected way.

Emphasizing appearance should not be minimized, for in the last analysis, assuming your customer is a normal shopper and has looked at and had demonstrated possibly 10 varied makes, this one factor alone may be the only clear memory of your stove remaining.

Before entering into an outline of detailed possible *operative* selling points, I wish to include one more general condition, which is by far the most important element in a sales effort, which I shall term:

Selling Ability

You must make your talk interesting. It matters not so much what you say, but how you say it.

If all conditions outlined herein are in operation then your lack of ability to prove interesting to your prospect is your own fault. A successful salesman is a consummate actor, called upon to do his turn every hour of the day. People actually classified as actors do their turn once to four times daily at a set time. You must be ready for your skit anytime.

You must, to drive your arguments home, convey an atmosphere of sincerity; create confidence, enthusiasm and interest; show a mastery of your subject, and be ready for a curtain call and a new audience at a moment's notice.

Selling Points

Selling points are just as necessary as the rungs of a step ladder. You use each to arrive at the top and the top of a sale can only be reached when a range is *sold* that makes a *profit*.

Writing up a sales tag that represents the disposal of any article without profit is a useless, wasteful function. The pencil you use, the sales tag you write on, cost money. You should at least save that much for future profitable use. Why write one more page in

(Continued from Page 19)

the already filled-to-overflowing volume of the "Mockery of Merchandising."

Mechanical or technical details are the most useful tools available if properly handled. Don't use technical jargon to awe your customer with your fund of knowledge, but by all means use your technical points to prove your sales arguments.

By your exploitation of sales points you create a desire for possession as the *primary motive* for purchase and *price* becomes *secondary*. I don't mean that price is no object whatever. It is, very much so, but good efficient salesmanship can make it the secondary consideration, and convenience and comfort the first consideration. Remember my reference to motive. Let's roll all gas ranges into one composite stove and try to sell that to an imaginary Mrs. Shopper.

You don't have to follow my same consecutive plan on selling points; but start somewhere and get in every one the stove you sell may possess.

Specific Sales Point

A sales point can be made of the method of mounting top guard or back guard. Properly constructed it is rigid and sturdy, it represents good workmanship.

The Shelf Platform: Maybe it is wide enough to hold a 12-inch plate for warming; or high enough above the cooking top to permit a wash boiler to pass under; or it is perforated for better circulation of heat around articles being warmed.

The Oven Top: Heavy enough to prevent warping; no flur collar to catch dirt or grease or chip base rims of plates or chip enameled utensils set on the tops for convenience. A finish that the effect of heat from the oven plus a hot teakettle setting on top of the oven will not soften or mar. Sell the idea to your customer.

The Splashers: Mounted to prevent cracking of porcelain; or constructed to eliminate deep crevices that hold grease; absence of bolts and nuts to tear flesh or rags.

Platform Brackets: Splasher points can be enlarged to include similar construction on brackets.

Cooking Top: Height from floor to prevent backaches; size or shape to permit use of large utensils without congestion; free of unnecessary protrusions.

Top Grates: Value of certain placement of cross bars or fingers to eliminate lodgment of grease; or easy movement of pans across surface of grates; or possibly strength that will avoid breakage.

Solid Top: One burner to cook everything; or variable temperature of such top; frying temperature at the front, simmering at the back; if vented, and a covered top should be, products of combustion entirely carried out of kitchen.

Burner Suspension: Burners securely and properly placed to maintain even spread of heat; proper distance or clearance between burners and top of grate surface to insure perfect combustion and maximum results.

Burners: To be non-partisan I can give no outline, but each burner has a story to justify its individual construction. Learn that story and tell it.

Manifolds: Point out bracket suspension; rigidity, seating of gas cocks.

Gas Cocks: Some manufacturers play up certain gas cock or gas valve construction. Find out the sales points and use them.

Drip Pans: Neatness of design to facilitate cleaning; rigidity of construction to prevent warpage, to providing a ready receptacle for "boiled over" liquids.

Service Drawers or compartments below burner box; storage space for skillets and culinary articles.

Broiler Door: Same as oven door.

Oven Racks: Free movement, maintenance of level surface preventing lopsided baking.

Broiler Pans: Bring into play same selling points as drip pans. Don't assume that the points are understood. Give voice to such points.

Oven Linings: Processed to resist rust, such as are enameled linings or Wilder or Toncan or Super Metal Linings or aluminized.

Oven Flues and Outlets: Explain fully the theory of conducting heat travel to provide even baking. A most important sales point.

Oven Insulation: Whether air space, asbestos or mineral wool. Explain fully the merits of whatever one you believe in and have for sale.

Oven Bottoms: Three types: 1. Cast iron. 2. Steel insulated. 3. None. All good. All possessing sales points. Learn the points and tell the story.

Oven Burners: Shape and suspension and location provide wonderful selling value.

Frame Construction: Four types: 1. Cast iron. 2. Pressed steel. 3. Angle iron. 4. T. iron. Each having particular merits that can be interestingly explained.

Full Porcelain Finish: Here is the greatest opportunity of selling finer,

greater profit-bearing ranges.

After pointing out the incomparable sanitation, convenience and appearance a full procelain range provides, bear down hard on the fact that a cheaply constructed range, even though fully enameled, is a bad investment. *Why*: A fully enameled range of any given type practically doubles the price of the same type in the customary six-piece trim so it must follow that if the stove foundation on which it is placed is flimsy, that it will wear, burn or rust out long before the value of the investment in procelain is returned to the buyer. Play this feature hard and retreat from the full to the ¾ to the semi- stubbornly and doggedly, for porcelain provides an argument that is unassailable.

Thus I feel you are provided with a key to possible sales points. Some ranges have part of them; none have them all. some are scientifically sound, others merely psychological, but they are selling points. Useful to those smart enough to use them, to make them living vibrant parts of a range. Dead, dormant, helpless things if depended upon to speak for themselves.

You must be your prospects' interpreter. Make them understand the language of gas ranges.

I am practically done with "How to Sell a Gas Range." No one knows how. If I really could provide a sure shot method I could earn a million a year. Many times I have done everything outlined here and lost a sale, but I am convinced it is worth doing, for it makes a wonderful average.

I know that many of you have a feeling that something is lacking. That once more a sales talk has failed to produce the magical secret—but, gentlemen, that unknown element, that mysterious thing I have not supplied and cannot supply is your own character. *You* either supply or fail to supply the successful conclusion of any sales effort. I have only tried to point out the possibilities for creating a sales talk. Creating it; learning it; using it, are entirely up to you.

FIRST ANNUAL MEETING OF CALIF. NATURAL GASOLINE ASSOCIATION

Sometime during the third week of May the California Natural Gasoline Association will hold its first annual meeting, the tentative date being Wednesday, May 19. Plans are for an evening meeting combined with a dinner. New officers will be elected and a paper will be delivered on a subject not yet announced. The paper is understood to be a discussion of results obtained from four methods of testing gas for gasoline content which have been under test at the Signal Hill gasoline plant of the United Oil Company during the past four months.

Paul Barton, president of the organization, announces that application blanks will soon be sent out to tnose eligible to membership; any eligible person failing to receive one should get in touch with J. S. Watson, secretary, at the Watson refinery of

Service Tag Proves Helpful Device

By W. H. Hermes
Black and Penn Sales Co., San Diego, Calif.

PLEASE NOTE

Do Not Light this Appliance as it has not been adjusted. Guarantee does not apply until we service same. As soon as gas is turned on notify us.

BLACK & PENN SALES CO.

MAIN 1708 **547 F St., San Diego, Cal.**

The service tag used by the Black and Penn Sales Co.

AFTER a number of years experience in selling and servicing gas appliances the writer has found that success and satisfied customers come principally from the extremely important item of correct adjustment of the appliance to meet local operating conditions. Also the fact that the customer must be thoroughly familiar with the correct principals of operation is significant.

Past experience has shown that practically all domestic users of gas as a fuel have not the slightest knowledge of what the proper adjustment of an appliance should be. In fact they can not distinguish any difference in a gas flame, should it be illuminating or bunsen. A card or tag giving operating instructions will help some, but it is hard for the average person to comprehend it.

Evils of Poor Installation

There have been many appliances forced off the market and a great amount of harm done the gas industry through improper installation, but no matter how correct the installation and adjustment, if the customer or user is not instructed and shown the complete operating details by the service man, the installation is bound to result in dissatisfaction and possibly a condemnation of the appliance.

If any of the readers of this article doubt the vital necessity of knowing just how to operate the average appliance, especially where there is a pilot light and the burner or burners are fairly well inside the cumbustion chamber, let him put himself in the shoes of a customer and try to light an appliance that is entirely new to him.

With the foregoing in mind, the tag pictured above was originated with the idea of keeping the customer or user from attempting to light the appliance until we had personally adjusted the same and at the same time thoroughly explained the operating features to him.

The tag is wired to the appliance at the store and has proven especially valuable in new homes built for sale, as prospective buyers are impressed with the idea of the service and guarantee.

Guarantee Policy is Effective

The word "Guarantee" on the tag seems to have created quite an impression in the mind of our prospective customer as well as the one who has already been sold. We rigidly adhere to the policy of complete customer satisfaction or the return of the appliance and the refunding of the full purchase price, no matter what type of installation.

Prior to the use of these tags we had a considerable number of installations of various types of appliances in new houses built for sale, where the gas was not turned on until the house was sold and we invariably found the new owners trying to operate the appliances and as you may imagine, with very poor results.

In conclusion, the little red tag has been the means of eliminating many complaints, has given the appliances a chance to make good, has insured better customer satisfaction and assured the sale of more gas and better appliances.

J. H. SATTERWHITE ON COAST FOR WESTCOTT AND GREIS, INC.

J. H. Satterwhite, general manager of Westcott and Greis, Inc., Tulsa, Okla., during April made a trip including points in Colorado, Arizona and California in the interests of his firm.

R. G. BARNETT DISTRICT AGENT FOR COAST COUNTIES

R. G. Barnett, formerly Peninsula representative of the Potter Radiator Corporation, has been appointed district agent of the Coast Counties Gas and Electric Company for Gilroy, Calif.

OIL BURNER COMPETITION NOT DEAD YET; PLAN PUBLICITY

Oil Burner manufacturers and dealers have evolved a comprehensive plan for co-operative publicity, by which they expect to reach more than 3,000,000 prospects for oil burning equipment in the next 12 months. This program came to light at the third annual convention of the American Oil Burner Association held in Detroit the early part of April.

C. B. BABCOCK RETURNS TO COAST FROM EASTERN TRIP

C. B. Babcock arrived in Los Angeles on April 29, returning from a business trip around the eastern circuit.

Stringing cable across Big Tujunga after second flood had partly subsided

Floods Menace Natural Gas Service

(Continued from Page 17)

by Wednesday afternoon was exposed to the full force of the stream as well as to the danger of floating timbers, ties and debris.

During the night the water rose to a new high mark, widening its channel into a stream 300 feet in width. The rising river during the night engulfed the two supporting "A" towers, washed out the "dead men" together with the supporting cables and exposed the 13-inch main to the full fury of the flood. With the rain still pouring and with the stream still rising, there was little that the emergency crew could do except watch the river as it cut the channel wider and wider.

Daylight on Thursday morning found the line entirely covered by the stream. It was holding, however, in spite of its span of 300 feet from bank to bank and in spite of the fact that it was bombarded constantly by a barrage of floating timbers, piles, ties and other debris washing down from railroad and highway bridges above.

The Last "Straw"

At seven o'clock on Thursday morning an industrial railroad trestle, located several hundred feet above the Company's line, collapsed and fell into the Big Tujunga River. Immediately it was caught in the current, washed down stream and lodged on the 13-inch main. Company men stationed on either bank expected that the line would at once be broken by the strain, but to their amazement it held. For an hour and a half the men watched the strange battle between the steel main on the one hand and tons of debris and timbers on the other. By 8:30 o'clock more debris and timbers had lodged on the line. This increasing weight, coupled with the constant pounding of timbers and the force of the stream, became too great and the line was washed out.

The main broke near the west bank of the stream. As the steel main gave way the gas pressure in the main threw water and rocks several hundred feet into the air. The pressure at this point was approximately 350 pounds. A few minutes later emergency valves on either bank of the stream were closed and the escaping gas turned off.

By this time the Whittier crew which had been on the scene constantly since Monday was exhausted and was relieved by a fresh crew from the Santa Monica Bay district under J. A. Moss. Then began the task of installing an emergency line across the 300 foot flood.

The Emergency Line

A. F. Bridge, executive engineer of the Company, took charge of operations. Mr. Bridge first arrived at the wash on Tuesday and had directed the installation of the cables and the "A" towers. Approximately 1000 feet of 6-inch pipe was rushed to the job, and Santa Monica welders began the task of welding the new line.

The work of getting the new line across the raging flood was a difficult one. First a rope had to be carried across the stream. This was accomplished by crossing upstream on a highway bridge. With the rope across, a one-inch cable was pulled across the river. A second cable was pulled across and secured to give the men support as they worked in the stream.

Two steel "A" towers were quickly constructed on either bank, these towers being 20 feet in height. One of the cables was suspended across stream on the towers. Then, as the line was welded, it was slowly pulled across stream with the support of the overhanging cable.

The 13-inch main had washed out at 8:30 o'clock on Thursday morning and by midnight on Friday a new six-inch line had been thrown across the Big Tujunga. This service interruption, which was, of course unavoidable, caused no inconvenience to the 108,000 consumers of the Southern Counties Gas Company, all other sources of supply being taxed to the full to meet their needs.

F. S. Wade, vice-president and manager of the Company, was generous in his praise for the two crews of men from Whittier and Santa Monica who worked night and day in a torrential rain to enable the company to save and repair its gas line. The Whittier crew under W. G. Rich was on the scene practically 72 hours without relief, and during this long period none of the men sought to leave. The Santa Monica crew labored under equally trying conditions, being forced to work up to their waists in the flood waters for many hours.

A. F. Bridge said that one of the outstanding features of the storm was the unexpected strength shown by the welded pipe when subjected to such terrific strain. The pipe was originally exposed to the flood and to all floating debris on Monday and it did not break until Thursday morning when tons of timbers and piling lodged against it. Even with this tremendous tonnage pressing against the line the steel main held for 90 minutes.

To Construct Suspension Line

The Southern Counties Gas Company will in the very near future begin construction of a suspension line across the Big Tujunga Wash. Two towers will be erected on either bank and the main suspended across the 400 foot arroyo.

The other service interruptions occurred at widely separated points on the Company's system. The 10-inch Carbon Canon line which carries natural gas from Orange County to the Pomona district was broken for about 18 hours. Construction crews dispatched from Santa Ana by District Manager J. C. Hayden and from Pomona by District Manager C. G. Spencer had great difficulty in negotiating the trip. Several large Company trucks became mired in the mud and lighter trucks had to be used in getting over the flooded roads. Service was restored early on Wednesday morning, April 7th, the washout occurring on Tuesday.

The Ventura-Santa Barbara six-inch transmission line which transmits gas from the Ventura compressor plant of Santa Barbara was broken on Wednesday, April 7th, by flood waters of Rincon Creek. This and another break in the line were repaired by Santa Barbara and Ventura crews. An important feature from the standpoint of service to our Santa Barbara consumers was the fact that we immediately put into operation the Santa Barbara oil-gas plant, thus preventing any service interruptions.

SET NEW RECORDS IN CUSTOMER OWNERSHIP IN B. C. E. RY. CO.

Serving a population of only 350,000 the British Columbia Electric Railway Company, Ltd., can look with pride upon its recent remarkable achievement in the launching of its customer-ownership program. Vancouver and Victoria residents applied for in excess of $7,000,000 of seven per cent cumulative preference shares of the British Columbia Electric Power and Gas Company, a subsidiary of the B. C. Electric Railway Company, in slightly more than five days in a drive conducted the latter part of March. Employees of the Company produced 10,851 applications totalling $5,625,300, although the amount offered for sale was only $2,250,000, the total issue authorized being $5,000,000. Only $750,000 had been allotted the employees for sale, and they themselves subscribed for $602,000 of stock, 47 per cent of them now being shareholders.

The British Columbia Electric Power and Gas Company was expressly organized to permit of customer ownership, as announced in the April issue of *Western Gas*, and the flood of requests for stock which greeted the campaign is the best of testimonials to the reputation enjoyed by the Company in its field of service.

PRINTING PRESSES ADDED TO SO. CAL. GAS CO. EQUIPMENT

Three small printing presses recently purchased by the Southern California Gas Company and installed at its 10th and Broadway, Los Angeles, headquarters, will make it possible to turn out many forms, bills, etc., which previously have been printed at commercial houses.

10,000,000 CUBIC FOOT GASSER IN WYOMING FIELD

The Inland Oil Index, published at Casper, Wyo., in its April 23 issue, reports the bringing in of a 10,000,000 gasser in the Pine Mountain district.

PERSONNEL DEPARTMENT SET UP IN PACIFIC GASOLINE CO.

R. R. Adams now heads a personnel department just established by the Pacific Gasoline Company, Los Angeles, made necessary by rapid expansion of the Company.

GAS ENGINES REPLACING STEAM TYPE IN MONTANA DRILLING

The Great Falls, Montana, Tribune is authority for the statement that natural gas enegines are expected to replace most of the steam engines in the Kevin-Sunburst Field, many rigs depending on steam power having been idle recently as a result of water shortage, which necessitated shutting down boilers.

HERBERT HOOVER TO ADDRESS NATURAL GAS MEN

When Natural Gas Association members gather around the banquet board on May 19, during the May 17-20 annual convention of the Association and the Natural Gas Supply Men, Inc., at Tulsa, they will have the privilege of listening to Herbert Hoover, secretary of commerce, who will deliver the principal address.

NATURAL GASOLINE MANUFACTURERS ANNUAL CONVENTION, MAY 5-6

An excellent program is in store for members of the Natural Gasoline Manufacturers Association who gather on May 5 and 6 for the annual convention in Tulsa. A. Ludlow Clayton, research engineer of the Sun Oil Co., at Philadelphia, will present a paper on "Characteristics of Natural Gasoline as a Non-Detonating Agency." Dr. E. H. Leslie and Dr. Geo. G. Brown, professors of chemical engineering at the University of Michigan, will prepare a paper on "The Relation of Volatility to Acceleration and Anti-Knock Properties of Natural Gasoline." Other promised features are: "Depreciation and Depletion," by A. B. Morris, Chestnut and Smith Corp.; "Research of Absorption Oil," by Arthur L. Davis, chemist of the Empire Refineries, Inc.; "Petroleum Trade Association," by W. R. Boyd, Jr., assistant secretary and counsel of the American Petroleum Institute.

NEW PLANT AT LOS CERRITOS INSTALLED BY WILSHIRE OIL

The Wilshire Oil Company, operating an absorption plant at Santa Fe Springs, has recently installed another plant at Los Cerritos, the northwest extension of the Signal Hill field, Long Beach. This plant was transferred from Huntington Beach, with some equipment added, including one 170 h.p. Cooper compressor unit. The plant is of C. F. Braun & Co., manufacture, 25,000 gallon capacity. Gas in its vicinity runs about one gallon to the thousand cubic feet, according to W. D. Smith, manager of operations for the Wilshire Oil Company. Although the Company has no production at Los Cerritos as yet, developments are expected immediately, and the absorption plant should be under operation in the near future.

At the Santa Fe Springs plant of the Wilshire Oil Campany some change has been made in the compressor equipment, as a move for gas conservation. Two steam driven compressors installed in 1923, have been replaced with two Cooper engine compressors.

Natural Gas Gasoline Statistics Summarized *for* 1925

By J. W. Mashaw and E. B. Swanson

Department of Commerce, Bureau of Mines, San Francisco, California

THE tabulation of statistics on the production and consumption of natural-gas gasoline was started in August for the month of July, 1925. Figures for the first six months of 1925 were not collected or published at that time but these are included in this report together with corrected figures for the last half of the year.

Daily average production increased from 17,281 barrels in January to 23,001 barrels in December. Recoveries per thousand cubic feet of gas treated increased from 1.197 gallons in January to 1.392 gallons in December. Consumption of natural-gas gasoline for the year amounted to 7,227,022 barrels, of which 2,565,972 barrels or 35.51 per cent was mixed with crude or unfinished oils and run to stills, 4,121,526 barrels or 57.03 per cent blended at refineries, and 187,758 barrels or 2.6 per cent used at natural-gas gasoline plants, leaving a balance of 351,766 barrels or 4.86 per cent unaccounted for in the reports received by the Bureau. Average daily consumption for the year was 19,800 barrels or 23 barrels more than the average daily production. Stocks of natural-gas gasoline at the beginning of the year amounted to 73,047 barrels, approximately four days supply at the then current rate of consumption. At the end of the year stocks showed a decrease of 8,448 barrels and amounted to 64,599 barrels, less than three days supply at the current rate of consumption. The following table shows the operating status of the plants in the state.

Months	Plants in California	Inactive	Operating	Included in this Report
January	140	3	137	137
February	140	4	136	136
March	147	6	141	141
April	149	7	142	142
May	150	8	142	142
June	155	10	145	145
July	159	12	147	147
August	162	13	149	149
September	164	11	153	153
October	168	16	152	152
November	162	19	143	143
December	166	21	145	145

NATURAL-GAS GASOLINE PRODUCTION AND RECOVERIES, 1925

(Gallons)

Months	BY METHODS								TOTAL	
	Oil Absorption		Compressor		Combination Compressor and Oil Absorption		Combination Oil and Charcoal Absorption		Drip			
	Production	Recovery	Production	Recovery	Production	Recovery	Production	Recovery	Production	Production	Recovery
January	13,252,941	1.088	555,526	1.282	8,641,839	1.399	.....	.....	49,449	22,499,955	1.197
February	11,651,416	1.049	485,007	1.234	7,725,228	1.362	.....	.....	39,825	19,901,476	1.159
March	13,770,267	1.087	583,448	1.258	5,905,887	1.435	3,276,448	1.388	38,419	23,574,469	1.203
April	13,729,116	1.143	564,748	1.284	5,852,465	1.480	3,311,433	1.564	27,317	23,485,079	1.268
May	14,783,959	1.187	605,445	1.320	6,526,359	1.573	3,199,616	1.604	21,985	25,137,364	1.319
June	14,526,252	1.175	572,877	1.312	6,183,486	1.536	2,907,133	1.575	15,201	24,204,949	1.297
July	13,558,660	1.130	590,134	1.425	7,200,343	1.465	3,017,585	1.573	5,679	24,380,401	1.266
August	14,483,666	1.173	502,958	1.365	7,939,271	1.412	3,334,969	1.577	6,357	26,267,221	1.284
September	14,621,490	1.205	609,567	1.352	8,125,263	1.377	3,232,055	1.479	17,131	26,605,506	1.287
October	15,893,781	1.227	503,066	1.500	8,572,035	1.408	3,562,532	1.500	18,365	28,549,779	1.312
November	17,826,664	1.281	563,177	1.597	6,597,840	1.431	3,621,330	1.548	17,380	28,626,391	1.349
December	18,560,985	1.327	574,138	1.619	6,886,114	1.449	3,904,445	1.610	22,005	29,947,687	1.392
Total	176,659,197	1.117	6,718,091	1.369	86,156,130	1.436	33,367,546	1.529	279,113	303,180,077	1.281

Production in gallons. Recoveries in gallons per 1000 cubic feet of natural gas treated.

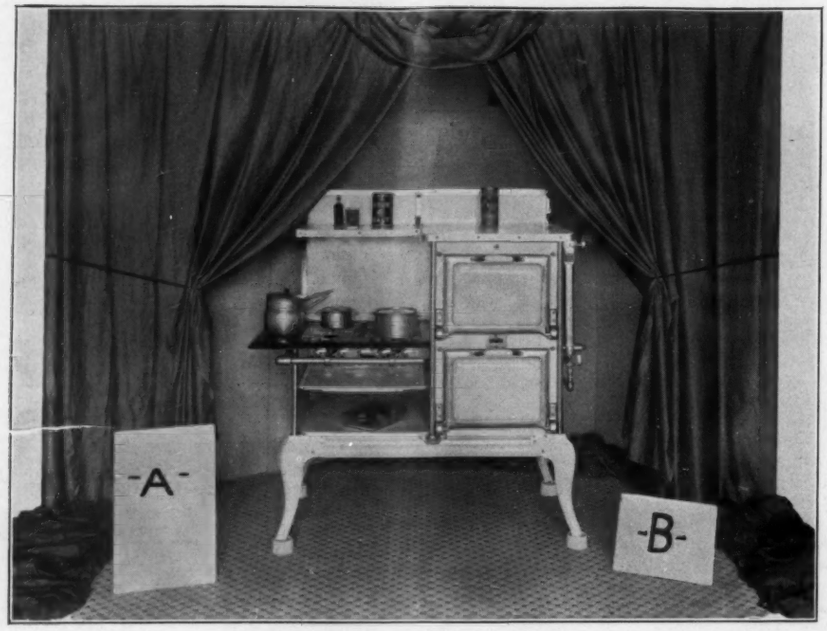
NATURAL-GAS GASOLINE UTILIZATION, 1925

(Barrels)

Mont	Production	Increase or Decrease in Stocks	Total Indicated Utilization	Mixed With Crude	Blended at Refineries	Used at Plant and Losses	Unaccounted for Balance
January	535,708	8,697	527,011	175,431	303,958	14,351	33,271
February	473,845	14,694	459,151	170,876	271,010	10,579	6,686
March	561,297	49,530	511,767	199,099	290,007	13,280	9,381
April	559,169	13,246	545,923	201,907	314,473	14,413	15,130
May	598,509	17,408	581,101	236,718	329,758	12,684	1,941
June	576,308	*21,787	598,095	181,225	340,641	16,809	59,420
July	580,486	2,400	578,086	214,269	325,107	14,415	24,295
August	625,410	12,308	613,102	230,859	308,651	20,925	52,667
September	633,464	*47,245	680,709	239,801	355,350	21,582	63,976
October	679,757	*46,429	726,186	274,061	382,706	14,376	55,043
November	681,581	*18,140	699,721	219,286	451,004	17,549	11,882
December	713,040	6,870	706,170	222,440	448,861	16,795	18,074
Total	7,218,574	*8,448	7,227,022	2,565,972	4,121,526	187,758	351,766

*Decrease.

Months	BY METHODS				Total
	Absorption	Oil Compressor	Combination Compressor and Oil Absorption	Combination Oil and Charcoal Absorption	
January	12,184,797	433,283	6,178,569	.....	18,796,649
February	11,106,973	393,034	5,671,742	.....	17,171,749
March	12,663,321	463,842	4,115,901	2,360,658	19,603,722
April	12,015,071	439,942	3,954,189	2,117,506	18,526,708
May	12,452,719	458,832	4,149,670	1,994,681	19,055,902
June	12,360,997	436,491	4,025,677	1,846,200	18,669,365
July	11,996,572	419,770	4,917,277	1,918,454	19,252,073
August	12,345,922	368,580	5,622,633	2,115,187	20,452,322
September	12,133,636	450,673	5,903,043	2,184,607	20,671,959
October	12,955,292	335,418	6,087,055	2,375,004	21,752,769
November	13,919,971	352,648	4,610,867	2,339,374	21,222,860
December	13,990,074	354,551	4,751,052	2,425,462	21,521,139
Total	150,125,345	4,907,064	59,987,675	21,677,133	236,697,217



Try This Simple Range Display

SIMPLE almost to the point of severity, the gas range window shown above shouts out its message of clean, convenient cooking in tones unmistakable. While the display is extremely easy to reproduce, its effectiveness will depend to a great degree upon the appearance features of the range chosen for exhibition. An all white enameled article is recommended, and it should be unnecessary to point out that the range should possess all those features of late introduction which have come to be recognized as essential—especially that of the oven heat control. It is a decidedly questionable policy to feature a single article in a window, unless the article will bear the most rigid scrutiny.

Here are a few hints on arrangement of the window illustrated. If your store window has no back, construct one of wallboard, about nine feet in width by height of your window. It is not necessary to finish the top and sides of this window background, as the drapes will hide all but the center.

Light blue sateen will contrast well with a white enameled stove, though other tones will serve equally well if drape material is already on hand. Hang the drape from the middle of the ceiling, over a pole or wire, and pleat the cloth as shown in the picture. By using narrow ribbons the drawn curtain effect shown above can be secured.

Place the range in the center of the window, partly under the drape. The two posters for sales messages should be placed to the foreground on either side. Cooking utensils, and other minor items such as salt, spices, etc., will give color to the setting.

Cost of the display will depend on the drapes selected, but should not exceed $10.00. *Western Gas* will appreciate receiving photographs of any reproductions of the display which are made by our readers.

EMPLOYEE ASSOCIATION LAUNCHED WITH 2,088 CHARTER MEMBERS

With 2,088 charter employees presenting themselves for charter membership at a pre-organization meeting held April 19, the Los Angeles Gas and Electric Corp. launched its organization program for its employee association. Success is assured the new association in the remarkable showing of charter applications, 90 per cent of the employees already indicating their desire for membership.

At the pre-organization meeting Frank Weiss, new business manager of the Corporation, was elected temporary chairman, Mrs. M. E. Kerlin temporary secretary, and R. R. Lloyd temporary treasurer. President Baurhyte and General Manager Day of the Corporation were present and gave short talks, assuring the employees of the cooperation of the management in the conduct of the new organization.

A committee of nine has been appointed to draft a constitution, and their efforts will be presented at a permanent organization meeting in May. The pre-organization membership committee was headed by D. L. Scott, manager of the department of public relations.

COOPER UNITS TO BREA PLANT OF UNION OIL COMPANY

Nine C. & G. Cooper compressor units were purchased in April by the Union Oil Company for the Company's compressor plant near Brea Canyon, Calif. The Coopers are all of 165 h. p.

Charcoal Adsorption

(Continued from Page 34)

gas, the mass of gas or vapor that can be taken up by the charcoal is roughly a function of the boiling points or critical temperatures. This explains why a series of temperature increases occurs when natural gas is passed through charcoal. The methane first passing through the charcoal gives the first temperature rise, the second temperature rise is due to the difference in the heat of adsorption of the ethane and methane, more ethane being adsorbed than methane. In the same way the third and fourth temperature rises are due to the replacement of ethane by propane, and propane by butane. The relative height of these temperature rises depends on the composition of the gas, the shape of the charcoal tube, and the rate the gas is passed through the tube. These temperature rises can not be taken as an absolute indication of the saturation of the charcoal as gases are known where only one temperature rise is observed, others where two only appear, and others where there are three and no more.

In the use of charcoal for testing the gasoline content of natural gas, the weakest point in the method lies in the distillation. The vapor pressure of the gasoline constituents on charcoal is practically zero at the temperatures ordinarily reached during adsorption. Therefore these constituents are removed quantitatively from the gas, provided the saturation of the charcoal has not been exceeded or the rate of addition of these compounds in the gas has not exceeded the rate of adsorption. During the distillation some of these compounds are carried through the condenser in the vapor phase by the fixed gases that have not been completely displaced. Also, if the rate of distillation is too great a large percentage of the gasoline coming off with the fixed gases is lost and the final temperature may be reached before all the gasoline constituents have been displaced from the interior of the charcoal grains. Pressure during distillation will retard the giving up of the heavier constituents from the interior of the charcoal. In the distillation with steam in the commercial plants the temperature reached is not high enough to remove all of the heavier constituents. These constituents gradually build up and in time will reduce the adsorptive capacity of the charcoal for the lighter constituents to such a point that it becomes necessary to remove the charcoal from the plant and reactivate it.

A 69% increase in Pacific Coast consumption of gasoline has been recorded in the last three years.

Protecting Underground Pipe *from* Electrolysis

pipe wrapping should be used and in good soils the less expensive insulations, like paints, should be selected.

Electrolysis is a chemical decomposition by an electric current. A number of useful uses is made of it, of which one is electro-plating. The weight of metal that will be decomposed by an electric current varies with different metal, but in all cases is strictly proportional, under ideal conditions, to the quantity of current. In the case of iron, one ampere of current flowing continuously for one year will decompose about twenty pounds of metal. This decomposition will not be distributed uniformly over the pipe, but will concentrate, in a general way, in small areas, which causes the pipe to leak when it has lost about 1-15 of its weight. It will be seen that this pitting action is extremely unfortunate, because it occasions a depreciation of the investment fifteen times as great as the per cent loss of weight of pipe.

Vagrant Current

The electricity that causes the damage is leakage, or vagrant current, from railway tracks, which are supposed to return the current from the cars to the substations. If the tracks were supported by insulators, like ordinary electric power lines, there would be no electrolysis because there would be no vagrant current. In order that the rails may serve in the other of their dual capacities, as road beds, they must be laid on and in contact with the earth in which lies a net-work of pipes. Since the pipes serve as conductors for the return of the current the same as the rails, they pick up the leakage current in the soil at points where it is discharged remote from the power plants. It is where the pipes discharge current to the soil that electrolysis occurs. In order to prevent this corrosion it has been common practice to install heavy copper connections, called drainage bonds, between the pipes and rails to drain the pipes, thereby eliminating the electrolytic flow of current from metal to earth. The objection to drainage bonds is that they serve as metallic bridges for the passage of the current, thus increasing the flow by making a good path for it. Joint electrolysis occurs on a pipe line where the current flows through the soil from one pipe length to another to get past a high resistance joint. Another objection to the heavy currents that are induced by the drainage bonds, is the increased danger to men at work on the pipes. Dangerous gas explosions and fires may be caused by electric sparks that occur when pipes carrying heavy current have their contacts made or broken.

Since electrolysis is caused by and is proportional to the street car vagrant current, the only means of overcoming it is to reduce the street car current leakage. Regarding the tracks and pipes as vehicles in which the current rides back to the substations, the amount of current carried by each vehicle increases with its capacity. Thus the rail current may be increased by installing larger rails and the pipe current may be decreased to practically zero by using insulating points between pipe lengths. It is impractical, of course, to tear up existing pipe systems for the purpose of installing high resistance points. Another means of reducing the leakage of the current between track and pipe systems is to increase the resistance of the path taken by the current at the transfer points. Rock-ballasting the tracks to prevent their contact with the

(Continued from Page 13)

earth, keeping the soil dry by drainage and paving, and insulating the pipes by some good covering will accomplish this. The installation of drainage bonds is a step in the opposite direction and is for this reason to be condemned, except as a temporary expedient.

Does Pipe Covering Protect?

It is the concensus of opinion of research engineers that the insulation of a pipe will afford no protection against electrolysis. It is their contention that no insulation, whether paint, dip or wrapping, will remain long water-proof when under electrolysis stress and will therefore sooner or later allow a leakage of current. It is claimed that this current will cause the pipe to leak just as soon, if not at an earlier date, than had the pipe not been insulated, because the action will be more concentrated at the small areas where the insulation fails. This Corporation has always accepted the former opinion that the insulation fails and permits a current flow after a time; but it has never accepted the latter conclusion that this much smaller current will cause the same or more severe injury to the pipe than that due to a larger current on a bare pipe. It has been the practice to cover the pipes with the best insulation in locations where either or both soil and electrolytic conditions were considered to be bad. In order to prove or disprove the wisdom of this policy, the following experiment was made:

Making the Tast

Eighteen pieces of new 2-inch pipe were cut in 10-foot lengths and sealed air tight. Provisions were made for introducing air under pressure through auto tube valves. These pipe specimens after being insulated with various paints, dips and wrappings, with two for each class and including two bare pipes, were installed in the ground and subjected to an electrolytic stress of about 20 volts. This voltage caused a heavy leakage from the beginning on the bare specimens and correspondingly smaller currents on the other specimens, depending upon the relative values of their insulations. These current intensities were carefully noted from time to time and also the life of the pipe in days from the start of the test to the time it would no longer hold air. The average life of the two bare pipes was 107 days, while that of the painted and dipped pipes, taken collectively, was 125 days. The test was continued for some time after the bare, painted and dipped specimens had broken down, in an unsuccessful effort to break down the specimens that were covered with a P & B felt paper wrapping, applied spirally with a machine. Figure 1 shows a photograph of the worst sections of the two bare pipes and Figure 2 shows similar sections of the machine wrapped specimens. In this latter are seen damaged spots equally spaced where electrolysis had occurred but not to the extent to cause a leak. This corrosion occurred beneath the laps or seams in the spiral wrapping. It had been anticipated that this lap was a weak point in the insulation and therefore specimens in Figure 3 had been wrapped longitudinally with the same paper, by hand, with an overlapping of about 2 inches, whereas the spiral lap in Figure 2 did not exceed ½ inch. It will be noted that these specimens show but a trace of electrolysis.

This test seems to prove that ordinary insulations, while not harmful in causing increased electrolysis, are not worth their cost, because their value is slight. The P & B paper which is regularly used by Los Angeles Gas and Electric Corporation, appears to be a marked exception to the general statements that pipe insulations are worthless as a means of protection against electrolysis. Having noted the weakness of this covering at the lap, the Corporation is now using a machine, which puts on a two spiral wrapping, with the laps of one wrapping covered by that of the other. This covering should afford an even better protection than that given the one-layer hand-wrapped specimens in Fig. 3.

One of the outstanding objections to the use of pipe insulation for protection against electrolysis is the fact the insulation becomes damaged here and there through handling and trucking. Extreme care should be used to prevent abrasions as much as possible, and when they do occur, to make repairs.

In addition to the electrolysis of underground iron pipe systems there is a similar corrosion of lead sheathing covering of underground conductors of electric light, power and telephone companies. A serious situation arises when for a thousand persons the gas pressure fails, the water flow stops, the light goes out, the elevator stops between floors or the telephone connection is broken. The very issues of life and death may depend upon the continuity of service. The reliability and the cost of service depend to some degree at least, upon the destructive agencies of soil and electrolytic corrosions and the means taken to combat them.

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Vancouver, B. C., Standard Bank Bldg.

WORK BEGUN ON P. G. & E. WATER GAS SET AT MARYSVILLE

The new water gas set of the Pacific Gas and Electric Company that is destined eventually to replace the oil gas process in supplying fuel to Marysville and surrounding communities was started on Monday, April 19. The $170,000 job is being handled by the P. G. & E., with the Steere Engineering Company furnishing the equipment. Work on the necessary transmission lines is already under way as well.

HIGH PRESSURE MAIN NOW TIES COAST COUNTIES WITH P. G. & E.

The new nine-mile, six-inch high pressure gas main that will tie in the Coast Counties Gas and Electric Company's system with the P. G. & E. is now being laid between Crockett and Grant, Calif. Gas from the latter company's plant in Oakland will be distributed by the Coast Counties through their lines to the towns of Selby, Tormey, Rodeo, Pinola and Hercules.

MAKE WAY FOR MALE COOKS! BOYS WIN KITCHEN CONTEST

Sad, but true, is the report rendered by Ernest W. Kimmell, gas sales East Bay Division of the P. G. & E., to the effect that in the recent cooking competitions held in his thriving community, boys who are taking domestic science courses (sugar coated under the label "camp cooking") completely outclassed the little girls in their knowledge of cooking technic, and in the quality of the finished product. Who knows but that the sales message of the future may staunchly advocate a nice new oven control cook stove to lighten the load on poor old dad.

BREUNERS FEATURES GAS WEEK BY STREET CAR SIGNS

Breuner's, Oakland California furniture and household supplies dealers, shouldered a large share of the load of advertising necessary to properly put across the spring appliance display. Among the advertising features that Breuner's used were large signs on the outside of all the city street cars, announcing the dates of Gas Week, and urging inspection and demonstrations of the new models.

U. S. REFINING COMPANY ADDS TO COMPRESSOR EQUIPMENT

One Cooper compressor was recently purchased by the U. S. Refining Company for its new natural gasoline plant near Watson, California.

NEW COLORFUL SERIES OF ADS BEGUN BY L. A. G. & E. CORP.

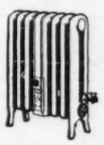
"Stories of Los Angeles" is the title of a series of local-history advertisements being run by the Los Angeles Gas and Electric Corporation.

S. WALDO COLEMAN HEADS RUSS BUILDING CORPORATION

S. Waldo Coleman, president of the Coast Counties Gas and Electric Company, San Francisco, has also been named head of the Russ Building Corporation of that city, which will handle the $6,000,000 bond issue necessary to the construction of the new 30 story building that is to be erected on the site of the old Russ Building, now being razed.

Real Men Wanted to sell the complete line of Pacific Gas Heating Appliances

Here are the Six Leading Types of Pacific Gas Heating Appliances — They Ventilate While They Heat.

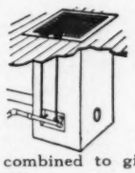


Pacific Pressed Metal and Cast Iron Radiators

An exclusive air circulation system — develops greater heat at a 25 per cent saving in gas. Sturdier construction. Special Features.

Pacific Gas Steam Radiators

Provide steam heat at lower cost than a central steam heating plant. Automatic control.

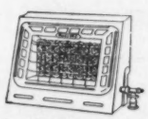


Pacific Floor Furnaces

No basement needed. Just turn a key. A pilot light ignites the gas. Instant heat. Two different systems of heating and air circulation are scientifically combined to give greater heat and less gas.

Pacific Unit Furnaces

Installed in basement or recess and supplies heat through pipes to all rooms. Upstairs control. Automatic temperature regulation if desired.



Pacific Gas Recess Radiant Heaters

Furnished in any desired finish. An air duct applies a continuous stream of fresh air to the flame. Outer casing is always cool.

There's a big money-making opportunity in every town for a man who can supply the demand ***for every type*** of gas heating appliance.

---that is proven by the experience of men who are now making money in a score of small cities, selling and installing Pacific appliances.

If you want to build up a real business---become known as "Gas Heating Headquarters," stock the whole Pacific line---then you can handle ***every*** job. No matter what the heating needs of any building, you have the units in the complete Pacific line to fill every order satisfactorily.

Interested in making money?---then write now to C. O. Menig, sales manager, and ask acout the Pacific dealer proposition for your city.

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NATURAL GAS GASOLINE OPERATIONS

Compiled by J. W. MASHAW

Department of Commerce, Bureau of Mines, Division of Mineral Resources and Statistics

ONE hundred and forty-five natural-gas gasoline plants, with a daily indicated capacity of 1,187,236 thousand cubic feet, report a recovery of 30,546,613 gallons of natural-gas gasoline from 22,134,061 thousand cubic feet of gas treated, in March.

Utilization of natural-gas gasoline amounted to 732,068 barrels, an increase over February of 55,442 barrels. Daily average utilization of 23,615 barrels was 154 barrels more than Daily average Production of 23,461 barrels.

Stocks of natural-gas gasoline at the end of March amounted to 84,093 barrels of which 21,049 barrels were reported by natural-gas gasoline plant operators and 63,044 barrels by refinery operators. This is a decrease of 4,768 barrels under February stocks. This stock figure of 84,093 barrels is approximately four days' supply at the current rate of consumption.

The production of gasoline during the month of March amounted to 168,361,233 gallons, a daily average of 5,431,008 gallons. This is an increase of 29,688,210 gallons or 21.41 per cent over February output. Of this production 231,744 gallons were reported as finished gasoline produced by natural-gas gasoline plant operators. Compared to the production in March, 1925, an increase of 38,107,809 gallons or 29.26 per cent is noted. Of the gasoline produced 109,606 gallons were from using either a cracking or synthetic process and 168,251,627 gallons from other processes.

Stocks of gasoline show an increase of 19,332,244 gallons during March and at the end of the month amounted to 431,343,747 gallons. This stock figure includes 9,536 gallons of finished gasoline reported by natural-gas gasoline plant operators.

CALIFORNIA NATURAL-GAS GASOLINE PRODUCTION, DISTRIBUTION AND STOCKS

March, 1926

PRODUCTION

Type of Power	Gas Treated M Cu. Ft.	Natural-gas Gasoline Produced Gallons	Gasoline Recovery per MCF Gas Treated
Oil Absorption	13,797,461	19,670,619	1.426 Gal.
Compressor	537,915	516,535	.96 Gal.
Combination Comp. and Oil Absorption	4,298,577	6,263,356	1.457 Gal.
Combination Oil and Charcoal Absorption	2,300,922	3,896,420	1.693 Gal.
Charcoal Absorption	1,199,186	177,541	.148 Gal.
Drip	.....	22,142	.....
Totals	22,134,061	30,546,613	1.380 Gal.

Finished Gasoline produced at plants 231,744 Gal.

DISTRIBUTION		
Stocks first of month		88,861 Bbl.
Production during month		727,300 Bbl.
Quantity mixed with crude or unfinished oils	257,335 Bbl.	
Used in blending at refineries	301,861 Bbl.	
Stocks end of month	84,093 Bbl.	
Used at Plants, Shortage and Evaporation losses	14,967 Bbl.	
*Balance	157,905 Bbl.	
	816,161 Bbl.	816,161 Bbl.

STOCKS		
Natural-gas gasoline held by natural-gas gasoline plant operators	884,053 Gal.	or 21,049 Bbl.
Natural-gas gasoline held by refiners	2,647,848 Gal.	or 63,044 Bbl.
Totals	3,531,901 Gal.	84,093 Bbl.

Finished gasoline (motor fuel) held by natural-gas gasoline plant operators 9,536 Gal.
Disposition of this balance was not accounted for in the reports received.

GAS FROM CABIN CREEK FIELDS TO GLENDIVE, MONTANA

Gas will soon be flowing to Glendive, Montana, from the Cabin Creek Fields, preliminary surveys now being in progress. R. J. Lindsey of the Hope Construction Company of Mt. Vernon, Ohio, was recently on the field with engineers conducting the survey. Extensive holdings in the Cabin Creek Field have been secured by the Montana-Dakota Power Company, together with a franchise to serve Glendive, and materials for the eight-inch line are already on the site. With a capacity of 60,000,000 cubic feet a day it is anticipated that the line will bring ample gas for domestic use in Glendive and also for supplying electrical generating power for the Montana-Dokota Power Company's system, supplying 40 towns in eastern Montana with electricity.

MILE DEEP WELL FLOWS THREE MILLION FEET FOR ASSOCIATED

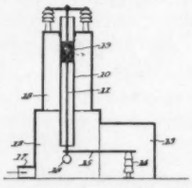
An oil well more than a mile deep has been brought in by the Associated Oil Company of California. The newly completed well is No. 26 Lloyd at Ventura, Cal., flowing 6,800 barrels of 29 gravity oil and 3,000,000 cubic feet of gas during an 18 hour test.

NINE KINDS OF GASOLINE NEEDED TO SUPPLY FOURTEEN STATES

In the 27 states in which Mid-Continent refiners ship the bulk of the gasoline they produce there are state specification requirements which demand nine distinct grades of gasoline. This is in spite of the fact that 13 of the 27 states place no bar on the kind of gasoline to be sold as motor fuel.

THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

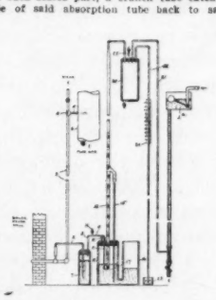
1,579,462. METHOD OF AND APPARATUS FOR SEPARATING LIGHT MATERIALS FROM GASES. HARRY A. WINTERMUTE, New York, N. Y., assignor to Research Corporation, New York, N. Y., a Corporation of New York. Filed Feb. 11, 1925. Serial No. 8,491. 8 Claims. (Cl. 183—7.)



1. The method of separating light suspended material from gases, which consists in passing a gas stream carrying the material in suspension through a passage, and subjecting the gas stream to an electric field causing a deposit of the material on the walls of the passage, the gas being passed through the passage at such velocity that under the action of the gas stream masses of the deposit are detached in agglomerated form and carried onwardly by the stream.

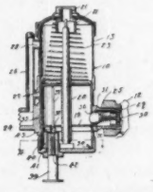
1,578,897. AUTOMATIC GAS ANALYZER AND CONTROL. LAWRENCE YOUNG and GILBERT W. RUGGLES, Youngstown, Ohio. Filed June 15, 1922. Serial No. 568,563. 18 Claims. (Cl. 23—255.)

1. In an apparatus for analyzing gaseous mixtures, the combination of a vessel containing a liquid capable of absorbing a constituent of such mixture, said vessel including two parts connected below the level of such liquid, one part sealed and the other open to the atmosphere, an absorption tube rising from below the liquid level in such sealed part, a branch tube extending from the side of said absorption tube back to said sealed



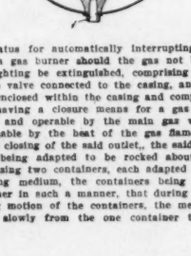
vessel part, a gas supply duct discharging into the lower end of said absorption tube, and means for placing the latter under suction.

1,579,951. AUTOMATIC GAS CUT-OFF. STANLEY POLSK, Farmington, W. Va., assignor of one-fifth to Antonio Pasko, Farmington, W. Va. Filed Jan. 12, 1924. Serial No. 685,914. 6 Claims. (Cl. 67—115.)



1. A device of the class described having a casing, a body movable in the casing to control its outlet, said body being closed at one end, means providing a passage for gas through the casing in communication therewith both above and below said closed end, the gas serving to normally maintain said body out of closing relation to said outlet, and a valve controlling the supply of gas subject to the movement of said body.

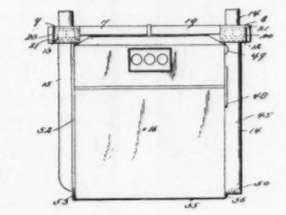
1,579,761. GAS VALVE. PIETER AUGUSTUS MARINUS HACKSTROH, The Hague, and OTTO VAN KEULEN, Haarlemmer Meer, Netherlands. Filed May 9, 1925. Serial No. 29,122. 4 Claims. (Cl. 67—116.)



1. Apparatus for automatically interrupting the gas supply to a gas burner should the gas not be lighted or after lighting be extinguished, comprising a casing, a main gas valve connected to the casing, an auxiliary gas valve enclosed within the casing and comprising an appliance having a closure means for a gas outlet of the casing and operable by the main gas valve, and means actuable by the heat of the gas flame for preventing the closing of the said outlet, the said auxiliary gas valve being adapted to be rocked about an axis and comprising two containers, each adapted to receive an actuating medium, the containers being connected to each other in such a manner, that during and after the rocking motion of the containers, the medium will flow more slowly from the one container than from the other.

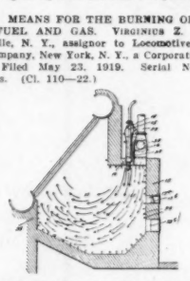
1,579,954. GAS-METER-PROTECTING MEANS. GEORGE H. SAUTON, New Orleans, La., assignor of one twenty-fourth to Charles F. A. Heitkamp, one twenty-fourth to Simon A. G. Heitkamp, and one twenty-fourth to Oscar R. L. Heitkamp, all of New Orleans, La. Filed June 26, 1924. Serial No. 722,561. 11 Claims. (Cl. 70—122.)

1. In a gas meter protecting means, the combination with a meter body and the coupling joints of the supply and service pipes communicating with the meter, of means for completely enclosing the said joints having members extending from one to the other with locking devices concealed within the members and protected



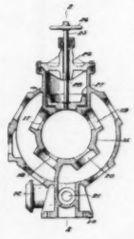
against exterior manipulation, and enclosing means for protecting the opposite end portions of the meter body extending upwardly over the said end portions.

1,578,953. MEANS FOR THE BURNING OF PULVERIZED FUEL AND GAS. VIRGINIUS Z. CARACRISTI, Bronxville, N. Y., assignor to Locomotive Pulverized Fuel Company, New York, N. Y., a Corporation of Delaware. Filed May 23, 1919. Serial No. 299,127. 2 Claims. (Cl. 110—22.)



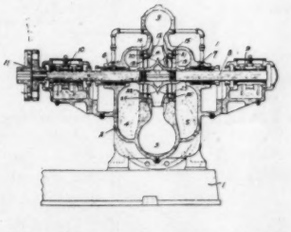
1. Apparatus for burning fuels in a furnace provided with means creating a draft comprising a combustion chamber having a waste outlet in an upper part, means for admitting pulverized coal in an upper part of the chamber to one side of the said outlet and adjacent a wall of the chamber and in a downward direction, and means for separately admitting a combustible gas into the combustion chamber in the upper part thereof in a downward direction into the space between the descending coal and such wall.

1,577,594. COMPRESSOR FOR GASES. NORMAN M. SMALL, Waynesboro, Pa., assignor to Frick Company, Waynesboro, Pa., a Corporation of Pennsylvania. Filed Sept. 24, 1924. Serial No. 739,719. 4 Claims. (Cl. 230—24.)



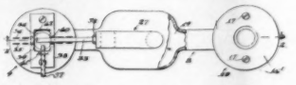
1. A compressor for gas comprising a cylinder, a piston, a cylindrical clearance pocket opening into the cylinder adjacent the end of the stroke of the piston, and a plunger in the cylindrical clearance pocket adjustable lengthwise thereof without stopping the compressor to vary the rate of operation of said compressor, substantially as set forth.

1,545,608. CENTRIFUGAL PUMP. JOHN J. SCHMIDT and ALBERT L. BEICK, Frederick, Md., assignors to The Frederick Iron & Steel Company, Frederick, Md., a Corporation of Maryland. Filed Oct. 31, 1924. Serial No. 747,071. 10 Claims. (Cl. 103—104.)



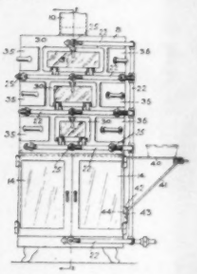
1. A centrifugal pump comprising in combination a casing, a shaft journaled in said casing, an impeller carried on said shaft, flat annular faces on each side of said impeller, a pair of circular members carried by said casing on opposite sides of said impeller, opposite screw threads in said members, and a pair of removable sealing and wearing rings engaged by said screw threads and having flat annular faces corresponding to said flat annular faces on each side of said impeller and aligned therewith.

1,579,535. BURNER. JOHN HIGHAM, Los Angeles, Calif. Filed Nov. 15, 1924. Serial No. 750,074. 6 Claims. (Cl. 158—65.)



6. In a burner of the character described, a gas conduit having a pair of disk-like head members at its opposite ends extending on a plane paralleling the length of the conduit, said conduit being formed with an enlarged chamber intermediate said head members, there being reduced passages leading from said chamber and opening to said head member, a vapor burner carried by each of said head members, and means for delivering a mixture of air and vapors to said enlarged chamber in said gas conduit.

1,576,978. STOVE. BERT A. KINSEY, Glenshaw, Pa. Filed Mar. 20, 1925. Serial No. 16,974. 5 Claims. (Cl. 126—39.)

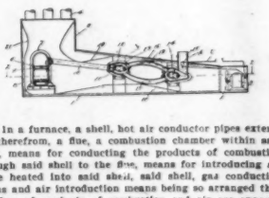


1. A stove comprising a casing, a diametrally disposed partition in said casing, openings provided in the casing wall of the front of said partition, for the reception of cooking vessels, a plurality of vertically aligned burners in the space between said partition and said wall, vent openings in said partition, and a flue opening at the rear of said casing with which said vents communicate.

1,578,109. GAS VALVE COCK. NAPOLEON I. TRUDELL, Burlington, Vt. Filed Aug. 10, 1925. Serial No. 49,413. 1 Claim. (Cl. 251—164.)

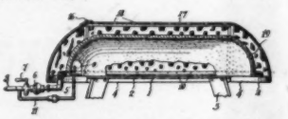
A gas cock including a body, a spring influenced plug and a handle for the plug, said body having its upper end provided with a comparatively wide slot, one wall of which is beveled, the plug having a stop pin for contacting with the opposite wall of the slot when the cock is shut off, the said end of the body having two spaced notches, the inner notch being of a greater width than the outer notch, said plug having a transverse opening therethrough, a locking lever passing through the opening and pivoted to the plug, said locking lever having a weighted depending dog end, and one side of said dog being beveled, all as and for the purpose set forth.

1,579,599. GAS FURNACE. CORNELIUS W. DE FOREST, Cincinnati, Ohio. Filed May 22, 1922. Serial No. 562,679. 7 Claims. (Cl. 126—116.)



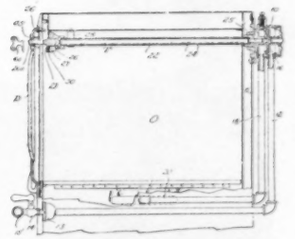
1. In a furnace, a shell, hot air conductor pipes extending therefrom, a flue, a combustion chamber within said shell, means for conducting the products of combustion through said shell to the flue, means for introducing air to be heated into said shell, said shell, gas conducting means and air introduction means being so arranged that the flow of products of combustion and air are opposite to each other, the incoming air being introduced to the shell beyond the flue exit with the hottest conducting means being located closest to the hot air conductor pipes.

1,577,651. GAS STOVE. ADOLIAN E. MOORES, Dallas, Tex. Filed Aug. 27, 1925. Serial No. 52,787. 1 Claim. (Cl. 126—85.)



A gas heater stove comprising a base, legs attached thereto, a gas burner pipe supported upon the base and having means for connecting said burner to a gas feed pipe; a pilot with pipe connection to said feed pipe and providing a constant lighting means for said burner with means for adjusting the pilot; said pilot disposed adjacent a central valve; a heat deflecting dome of suitable material seated upon the base; a reticulated covering for the stove, a frame for the covering and a door in one end of the covering; the sides of said covering substantially following the line of an arch and connected at the top by a ridge or strip with spaced apertures; said door being hinged to the covering, the door and opposite end of the stove having a rounded bottom and arched formation.

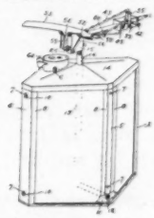
1,578,939. THERMOSTATIC CONTROL FOR STOVE OVENS. ALBERT H. TINNERMAN, Cleveland, Ohio. Filed May 9, 1924. Serial No. 711,955. 14 Claims. (Cl. 236—15.)



1. In a stove the combination of an oven structure including a door, a thermostatic control device enclosed by the oven and mounted independently of the door, a dial mounted upon the door and means extending from the thermostatic control device to the dial whereby the thermostat may be set without opening the door.

1,578,430. CIGAR LIGHTER. SAMUEL E. GUINN, Johnson City, Tenn., assignor to S. E. Guinn Manufacturing Co., Cincinnati, Ohio, a Corporation of New York. Filed Apr. 8, 1922. Serial No. 550,877. Renewed July 30, 1925. 10 Claims. (Cl. 67—4.1)

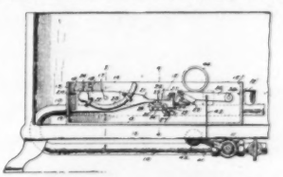
1. A cigar lighter, including a casing having a forward face presenting panel receiving advertising spaces, a gas conduit passing through the casing and extending above the same, a valve casing mounted upon the upper end of the conduit, a gas conduit passing through the valve casing, a gas pipe leading from said conduit and extending beyond the valve casing, a pyrophoric igniter supported on said pipe, a valve in the valve casing for



controlling the gas passage therethrough, and a handle mounted on the valve casing for operating the valve and pyrophoric igniter.

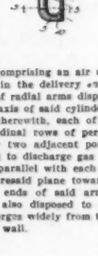
1,580,033. AUTOMATIC GAS CUT-OFF. HARVEY GODFREY, Newport, Ky. Filed June 1, 1925. Serial No. 34,048. 5 Claims. (Cl. 67—116.)

1. In an automatic cut off for gas burners, a controlling valve in the supply conductor adapted to be closed by a weighted lever, a poised supporting member, a thermostatic device coupled to said poised member and operative to control the movement thereof by change of temperature, a swinging arm connected to the weighted valve lever, a movable trip latch carried by said swinging arm, a stationary inclined stop 45 engaged by said

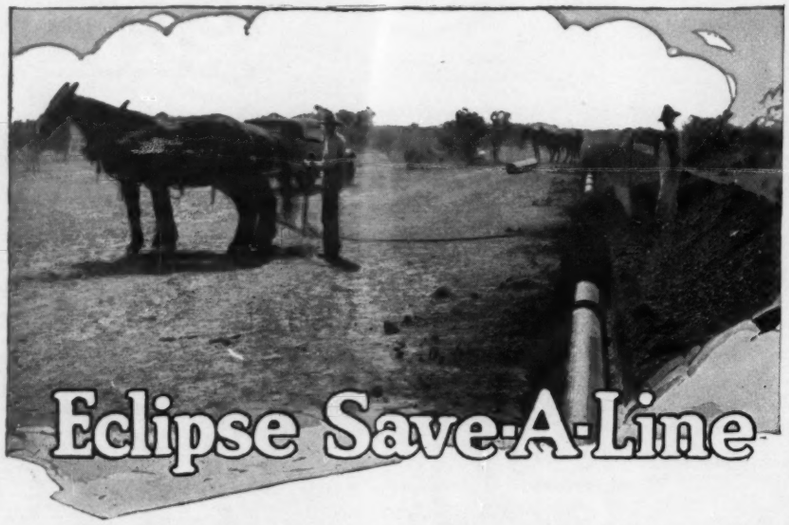


trip latch to hold said swinging lever arm in position to hold the valve open, a swinging trip plate having a vertical terminal normally engaging the trip latch, and a trip finger swinging upon the trip plate and limited in its movement in one direction and extending into the path of the poised supporting plate.

1,578,210. LOW-PRESSURE GAS BURNER. HAROLD D. SCHRADER, Midwest, Wyo., assignor of one-half to Leo Maynard Stauffer, Midwest, Wyo. Filed Aug. 17, 1925. Serial No. 50,751. 3 Claims. (Cl. 158—114.)



1. A gas burner comprising an air admission cylinder, and a burner head in the delivery end of said cylinder having a plurality of radial arms disposed in a plane at right angles to the axis of said cylinder and terminating in spaced relation therewith, each of said arms having two parallel longitudinal rows of perforations, the perforations along any two adjacent portions of any two arms being arranged to discharge gas between said arms on lines which are parallel with each other and diverge widely from the aforesaid plane toward the wall of the cylinder, the outer ends of said arms each having a central perforation also disposed to discharge the gas on a line which diverges widely from the aforesaid plane toward the cylinder wall.



Eclipse Save-A-Line Securely Protects Hundreds of Miles of Pipe Line on The Pacific Coast.

Eclipse Save-A-Line forms a thick, elastic film or coating, reinforced with asbestos fibre, which contracts and expands with the pipe and is unaffected by moisture, alkali, lime or electrolysis. It can be applied without heating and by inexperienced labor.

Let us know your requirements. We will be glad to send you sample and quote you prices. If you have any particular difficulties peculiar to your soil or climate, our San Francisco Office, 523 Rialto Building, Mr. E. B. Hagar, Manager, is at your disposal.

A Few of the Larger Users of Save-A-Line

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The Gulf Pipe Line Company
Associated Pipe Line Company
Humble Pipe Line Company
Lone Star Gas Company
Associated Oil Company

Their experience is your guarantee of satisfaction

This Product was formerly our Eclipse Asbestos Pipe Line Paint

The Eclipse Paint & Mfg. Co.

Cleveland, Ohio, U. S. A.

Dallas Denver San Francisco Newark Philadelphia

Byllesby Engineering and Management Corporation

231 S. La Salle St.
CHICAGO

New York Tacoma San Diego

Women Utility Employees

(Continued from Page 16)

Women's meetings are held once a month. An educational program is carried on, papers are presented by members on different phases of the utility industry. This prepares them so that they become more capable to go before outside groups and tell the utility story.

All members are interested in safety first and are efficient in the prone pressure method of resuscitation and the fundamental principles of first aid.

The Women's Committee has held receptions for women customers, thus bringing customers into the Company's offices who otherwise would find no interest there. They have been active during appliance demonstrations, take part in radio talks at weekly intervals, and are concerned in home service work.

An address before an economics class at the State University on "Inter-relation of the Utility and the Community", by one of the members, proved very successful and showed the interest that a utility company has in the development of the community. Such an organization helps the woman employee to appreciate the fact that no matter how small her position in the company may be, she helps to turn the wheels of progress for an industry that recognizes the ability of women.

"BALLOON AND AIRSHIP GASES" JUST OFF PRESS

A volume entitled "Balloon and Airship Gases," by Col. C. deForest Chandler and Lieut. Walter S. Diehl, has just been published, being a complete manual of information of the production, handling, and storage of gases suitable for use in balloons and airships. There are chapters describing the production of hydrogen; another is devoted to coal gas, pointing out the effect of changes in temperature and time of distillation, and explaining the alterations necessary in the manipulation of a coal-gas plant in order to produce a very light gas suitable for free ballooning. In dealing with the storage of gases, much practical information is given regarding gasometers and piping. Another important chapter deals with helium. To manufacturers and users of compressed gases, the extensive descriptions of compressing machinery, cylinders, valves, and connections, will be useful.

The second part of the book is a valuable compendium of gas information of reference value to physicists. It sets forth and explains concisely the formulas needed in gas computations. Many tables are included in a form convenient for use by operating and research engineers. Fully illustrated. 226 pages. Cloth. $4.00. Ronald Press Company, 15 E. 26th St., New York, N. Y., publishers.

TONNER CANYON PLANT OF G. P. HAS FIVE COOPERS

General Petroleum Corporation has purchased from C. & G. Cooper Co. five compressor units, to be installed at its Tonner Canyon plant, Southern California.

W. M. BERRY ON NORTHERN CALIF. TRIP FOR GAS COUNCIL

Walter M. Berry, chief engineer for the California Gas Research Council, returned April 1 from a several days trip in northern California in the interests of the Research Council activities. At Stockton, on March 23, Mr. Berry gave an illustrated lecture to gas men of the Western States Gas and Electric Company on the development of the gas industry, and on various phases of gas combustion problems. At San Francisco the engineering and commercial staff of the Pacific Gas and Electric Company's San Francisco Division listened to the same lecture, on March 29.

While in San Francisco Mr. Berry visited the laboratories of the P. G. & E., where the staff is actively engaged in experimentation with Pacific Coast coals.

Stopping at Salinas Mr. Berry went through the new plant of the Coast Valleys Gas and Electric Company, plant designed by J. E. Kelley, general superintendent of the company. Modesto was also visited by Mr. Berry, and he reports that the Modesto Gas Company's increase in sendout last year is highly creditable.

RANGE WEEK MEANS COMPANY PUBLICITY IN PORTLAND

National Gas Range Week was observed from April 19 to 24 in Portland, Ore., and gave the cause of gas, local appliance dealers, and the Portland Gas and Coke Company as well, some desirable publicity. News writeups of various Company departments, among them the billing department, was featured in the city dailies.

Needless to say, the Portland Gas and Coke Company was in the lead in making a success of the Week. John H. Hartog, salesmanager for the Company and secretary of the Portland Gas Appliance Dealers' Association, was in charge of general publicity and details, and saw to it that there was an abundance of advance advertisement of the event.

During the week, gas range dealers participated in a window exhibit contest, awards being prize ribbons. National Gas Range Week was introduced several years ago by the American Gas Association.

BABCOCK FURNACES TO BE MADE BY ROPER CORPORATION

C. B. Babcock, San Francisco manufacturer of the Babcock Furnace, one of the best known of western heating units, announces on his return from an eastern trip, that the Geo. D. Roper Corporation of Rockford, Ill., has purchased the manufacturing rights on the Babcock Furnace. As soon as arrangements are completed the point of manufacture will be shifted to Rockford, and national distribution will be secured for the furnace. Mr. Babcock will continue to serve as western manager for the Geo. D. Roper Corporation, in charge of distribution of Roper Ranges and Babcock Furnaces.

BARBER JET BURNERS DESCRIBED BY MANUFACTURER

Harry E. Kerr, president of the Cleveland Gas Burner & Appliance Company, Cleveland, Ohio, announces that the Company will shortly have ready for distribution its literature illustrating and describing its new line of Barber Jet Burners, which have been undergoing severe tests during the past year. These new burners will be brought out in 12 various designs having gas capacities ranging from six cubic feet to 250 cubic feet per hour upon three-inch gas pressure.

"Easy to have a clean kitchen with the *new* Gas Range—

"A kitchen that will stay gleaming white longer than you've ever known.

"And one reason for this—the *new* Gas Range has a smooth-top, scientifically built into the range. Here's the shield which protects your kitchen by sending all products of combustion through an especially designed flue.

The closed-top keeps the flames from touching your bright cooking utensils

"Another reason for the cleanliness of the *new* Gas Range is that the smooth-top itself, is so easy to clean."

See them at the dealer's store or inquire at our office.

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned · Operated · Managed
by Californians

205-426

One of the cooperative advertisements published in all newspapers in the Gas territory served by the Pacific Gas and Electric Company.

AMRECO
CHECKER BRICK

—a superior generator refractory!

HERE'S a specialized refractory ...developed in our own laboratories ... with high resistance to spalling and disintegration. ¶ The marked ability of Amreco Checker Brick to absorb heat and liberate it ...due to being the proper density... is a feature which appeals to gas men. ¶ Amreco shows little shrinkage and is very durable under intense heat and severe service.

Complete information and prices on request.

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CHEMICAL PLANTS · PACKING HOUSES · ICE PLANTS
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FACTORIES
· LOS ANGELES · SOUTH SAN FRANCISCO · FRESNO · PHOENIX · TAFT ·

Public Relations Success Rests *with* Employees

(Continued from Page 12)

apathetic attitude on the part of the gas company. When all is said and done—it is the gas company's gas that kills or explodes, and the gas company is altogether too frequently and very often unjustly charged with the responsibility for the accident and has to sustain the brunt of most of the unfavorable resultant publicity. Obviously it is good business sense for the gas company to exert every effort that will minimize accidents of any and all character incident to its operations and which will tend to extricate it from an unenviable position in which it has been placed through causes over which it has little or no control.

Eliminating Menaces to the Industry

Manufacturers who persist in putting out improperly designed appliances, dealers who handle them, and contractors or plumbers who cheapen installation costs as a means to secure business, are a real liability to the gas industry and to the purchaser of equipment. The gas company should not temporize with, nor tolerate such practices. We should insist that the manufacture, sale and installation of all gas appliances be conducted along approved safety standards, and if these people cannot be induced to change their methods we should endeavor to eliminate them as in the case of any other menace to the health and safety of the community.

We should not become hysterical over the accident situation. As a matter of fact the number of accidents is in no way alarming. The Secretary of our Association reports that for 1925 accidents in all Pacific Coast gas company territory, minor cases excepted, totaled only 170. Estimated total people served, six million, or one accident to approximately 35,000 population. According to the Masser report the death rate due to asphyxiation in Los Angeles during the winter of 1924-25 was about one person to every 60,000 population, not a particularly high rate when compared with accidents from other sources. One thing which tends to focus the public mind on asphyxiation is the large number of suicides by the so-called gas route. It appears to be a popular method in the use by those who are determined to "shuffle off this mortal coil." Perhaps our advertisements that gas is clean, quick, and convenient are taken too literally by those who unintentionally cast an odium on our industry in the performance of their last earthly act. Records from the coroner's office covering the period from June 1924 to July 1925, show that of all deaths occurring from asphyxiation in San Francisco, 63.9% were suicides. These are, of course, nonpreventable, but nevertheless reflect ad-

versely on gas as a safe commodity.

All in all the number of serious and fatal gas accidents is not relatively large. The important point to bear in mind is that many of them are preventable. As stated before, no matter what the cause, it is the gas company's gas that injures or kills and it is up to the gas industry as a protective measure if for no other reason, to take leadership in the movement that will effectually and I trust speedily eradicate all causes from which preventable gas accidents occur.

It should never be said that the gas industry has left a stone unturned to make the use of gas absolutely safe. With testing laboratories and appliance certification and installation ordinances, we will doubtless remove the source of many accidents. Educational work now being carried on by most gas companies should be continued and expanded, and the cooperation of the manufacturer, dealer, and installer of appliances in this essential work should be solicitated and encouraged. Better education of the user of gas is of paramount importance. A well devised service manual distributed to all consumers is an excellent medium for this purpose. Excerpts from such a manual can occasionally be used to advantage in display advertising.

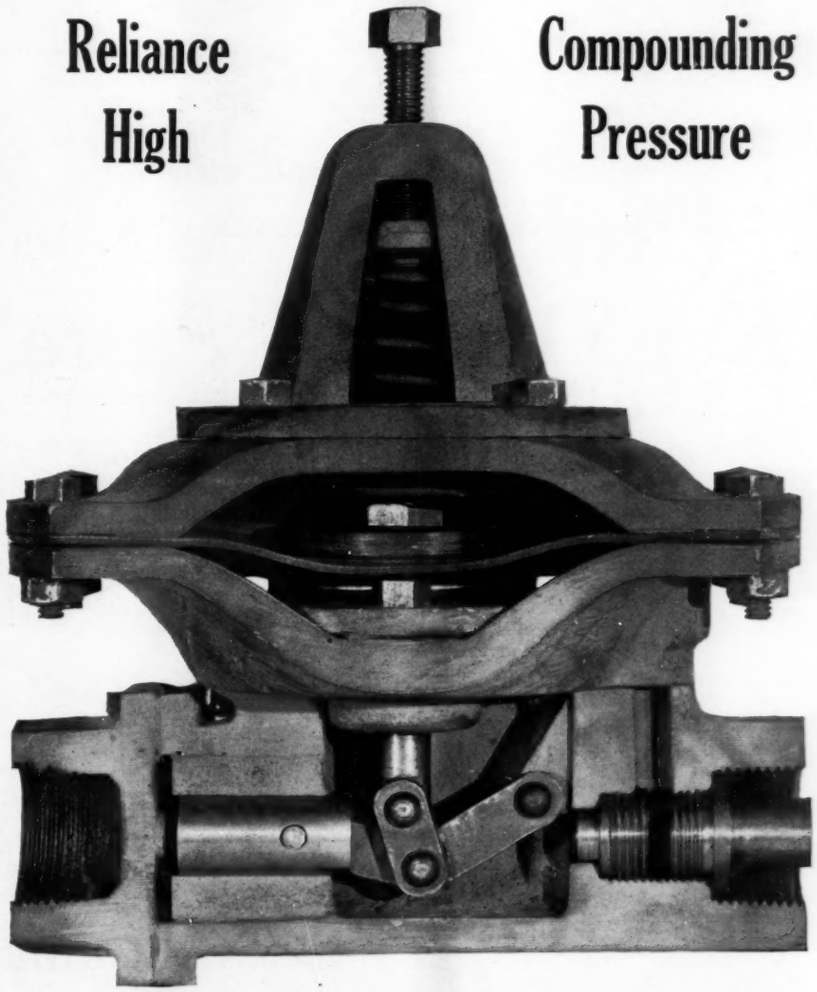
The Employee Is the Vital Unit

Here again, and this brings me back to the subject of this paper, the most effective way of educating the consumer is through the employee contact. Every employee who in any way has anything to with with the establishment and maintenance of service or appliances, should be thoroughly versed in the proper method of gas utilization and the dangers attendant upon its improper use. He should be possessed of sufficient judgment and discretion to furnish intelligent advice to the consumer, and he should be so supervised as to insure against the omission of any necessary action required to safeguard the use of gas.

Public relations is a very comprehensive subject. It touches every branch of the industry, as well as every one engaged in it. I have in no way attempted its full discussion but rather have confined this paper to some of the things which I believe to be pertinent to the subject and which it is hoped will be of interest and possible benefit to the members of this Association.

The points I have endeavored to make are, that the subject of public relations, all important as it is, is neither technical nor especially complicated; that its purpose is to establish a better understanding between the public utilities and the consuming public; that its

Reliance High Compounding Pressure



The Reliance Compounding High Pressure Regulator has now been tested over a period of a year under all conditions and pressures varying from 5 to 400 pounds inlet. We are prepared to furnish them in ¾ in., 1 in. and 2in. sizes, and can guarantee that for close regulation, positive lockup, accessibility and **capacity,** they are in a class by themselves.

Reliance Manufacturing Co.

Pasadena, California

FITTINGS

You can order fittings of any kind for immediate delivery from our large stock.

We also produce:

FLINTCAST **CORROSIRON**
MONEL METAL **GREY IRON**
SPECIAL IRON

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Harrison and Eighteenth Streets,
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The—*King*

of all screw thread and
Gasket Compounds

Key Graphite *Paste*

Stops the Leaks and Keeps 'em Stopped

Try a Sample on Your Hardest Joints
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proper and constructive development is to a large degree dependent upon a thoroughly informed organization; that each and every member of that organization has and must assume his definite responsibility in the interpretation of company policies, and that in the discharge of this responsibility common sense and good business ethics should invariably be applied. As executives we must ourselves do those things which we ask and expect of our employees. In other words we must practice what we preach.

P. G. & E. SOON TO HAVE NEW COMPRESSOR STATION

Construction work on the 50th Avenue, Oakland, compressor station of the P. G. & E. has just been started. This station, which adjoins the site of the new 10,000,000 cu. ft. waterless gas holder, will consist of three electric compressors, 50 lb., with 200,000 cu. ft. per hour capacity each, and two centrifugal compressors, 8⅓ lb., with an hourly capacity of 500,000 cu. ft. each. The station when completed will supply the gas to East Oakland, San Leandro, Hayward and Alameda. The total cost has been set at $229,000.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC.,

Required by the Act of Congress of August 24, 1912, of *Western Gas*, published monthly at Los Angeles, California, for April 1, 1926.

State of California, County of Los Angeles, ss.

Before me, a notary public in and for the State and County aforesaid, personally appeared Jay E. Jenkins, who, having been duly sworn according to law, deposes and says that he is the publisher of *Western Gas*, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Jay E. Jenkins, Los Angeles, Calif.

Editor, James E. Jenkins, Los Angeles, Calif.

Managing Editor, George H. Finley, Los Angeles, Calif.

Business Managers, Jay E. Jenkins, Los Angeles, Calif.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Jay E. Jenkins, Los Angeles, Calif.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

There are none.

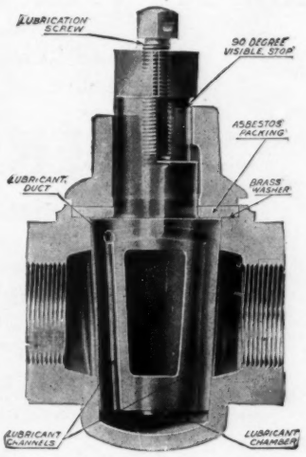
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is..... (This information is required from daily publications only.)

JAY E. JENKINS, Publisher.

Sworn to and subscribed before me this 22nd day of March, 1926.

(Seal) G. ROY PENDELL,



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The Merco Nordstrom Plug Valve is absolutely positive in operation. It wont stick or leak.

The lubrication feature is unusually efficient and simple.

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High Pressure Service Governors
Low Pressure Service Governors
Separate Mercury Seals
Single District Station Governors
Double District Station Governors
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Intermediate Pressure Governors
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Free Engineering Service on all Pressure Conditions —Write Us

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Represent Twenty-five Years
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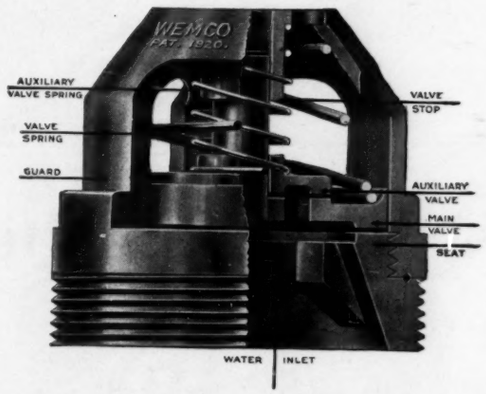
Your Pump is as good as Its Valves



The construction of the valve illustrated is such that the lift is greater than the valve area, insuring a free and unobstructed flow. All valves are made to guage and have the same lift. It has no studs, bolts or pins to become broken or lost.

HIGH pressure between suction and discharge valves means piston and valve slip, with a corresponding decrease in pump efficiency,—a direct loss in dollars and cents is the result. Wemco engineers have found instances in which 62% increase in valve area was required to allow for the maximum flow at the operating piston speed. Where Wemco Double Guided Pump Valves were installed, the desired increase was obtained. And invariably the valves paid for themselves within a short period.

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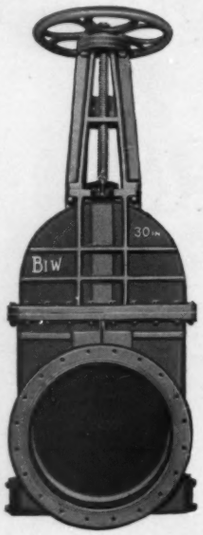

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Los Angeles, California

Manufacturers of

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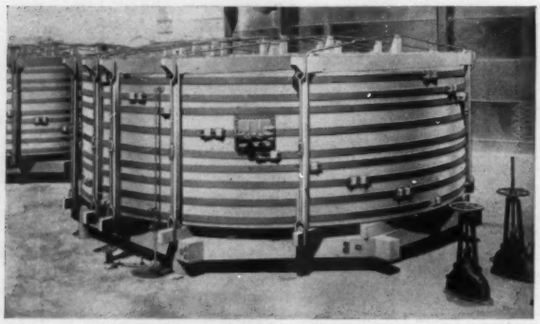
Gray Iron Castings
Low Pressure Valves



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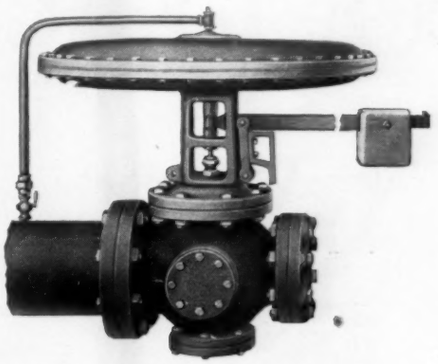

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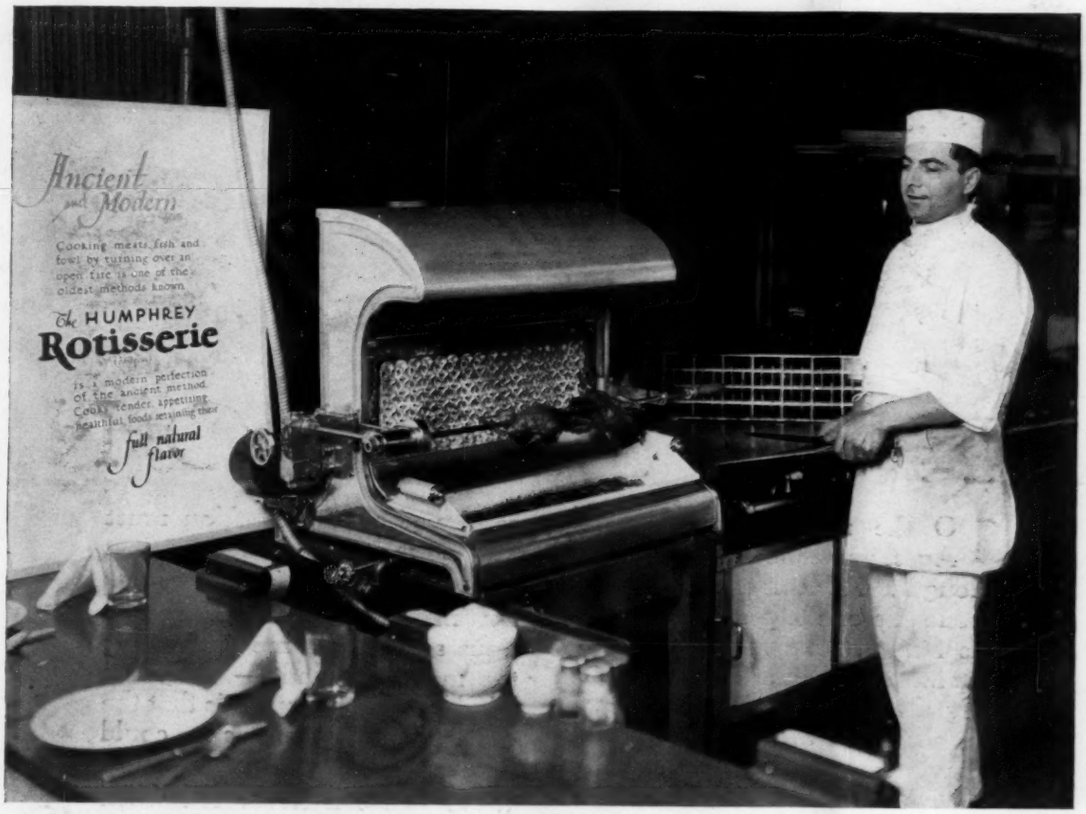
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